Looking Ahead

• Washington continues to be the source of the most significant news of the day. Next month we will attempt to appraise the situation in the national Industry Recovery Act, although this really is of less direct significance than the Farm Relief Act for food manufacturers.

• During the summer months FOOD INDUSTRIES will publish articles on the following subjects:

How One Manufacturer Improved Sales by a Simple Method.

How a New Superintendent Got Badly Fooled by His Own Boss.

Easy Way to Make a ChilyBear Cup Filler.

Products From Bananas.

How Molding Starch Is Dried and Cleaned.

How a Flour Mill Reduced Costs by a Common-Sense Method That Had Never Been Tried Before.

What Is the Right Price for Green Produce for the Canning Factory?

A New Way to Pasteurize.

How to Prevent Whitening of Cans During Processing.

How to Make Some Ingenious Devices Around the Plant.

How Soluble Milk Sugar Is Made.

Changes That Take Place in Frozen Foods in Storage.

Rapid Washing of Motor Vehicles.

How to Can Spaghetti.

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• Subscribers are invited to send in very short articles on ingenious devices they have built to save labor, materials or money in food plants. Write a short letter—say, 250 words—and send an explanatory sketch. You will receive a check for $3 to $10 for each item suitable for publication.

THE EDITORS.

FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

LAURENCE V. BURTON, *Editor*

M. A. WILLIAMSON, *Publishing Director*

Contents for June, 1933

VOLUME 5 NUMBER 6

Industry "Agreements" Are Likely to Be the First Result of Applying Farm Relief 202

What Industry Thinks of the Six-Hour Day 205
BY MYRON A. LEE AND PAUL H. SETZLER

Sugar—Commodity? Ingredient? 208
BY WM. LUDWELL OWEN

Air Conditioning Reduces Losses in Bakery Products 209
BY W. W. REECE

Thermostat Prevents Costly Breakdowns in Motors 212
BY H. C. BRUNNER

Dehydration by Absorption Characterizes "Cast" Confectionery Manufacture 213
BY OTTO H. WINDT

Your Rat and Mine—Their Eradication 216
BY HARRY STINER

Whether It's Tap or Lager, It Must Start With Good Water, Hops and Malt 218
BY PAUL JOHN KOLACHOV

Choosing Fuels on the Basis of Plant Performance 221
BY GUY MANKIN

Public Interest Does Not Demand Motor Truck Utility Regulation 224

Editorial 201
New Books 226
Current Literature 227
New Products 228
News 230
Men, Jobs and Companies 234
Business Trends 236
New Equipment 238
Manufacturers' Catalogs 239
New Construction 240

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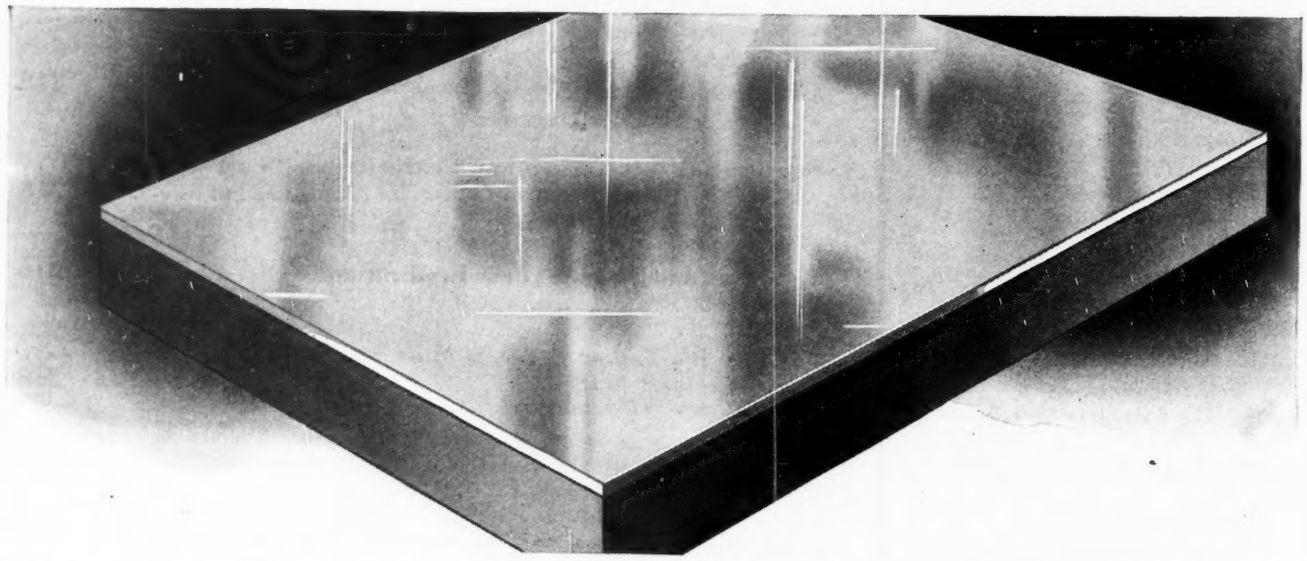

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FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

Volume 5 . . . . . Established 1928—McGraw-Hill Publishing Company, Inc. . . . . Number 6

NEW YORK, JUNE, 1933

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Laurence V. Burton, Editor

Effect of Anti-Trust Law Lifted for Food Manufacturers

THE farm problem is to be attacked from many sides. Immediately available are three major administration projects:

(1) Controlled inflation by raising commodity prices generally will be of peculiar advantage to the farmer. It will restore something like normal relationship between goods prices and the cost of money, which latter to the farmer means cash expenditure in taxes, interest on mortgages, and like fixed-sum obligations.

(2) International trade agreements, particularly tariff adjustments, are vital. If successful, they will afford renewed outlet for the products of American farms. The difficulty is not to get others to accept these American exports. The problem is to find what we may take in return.

(3) *Industry agreements, negotiated by the Secretary of Agriculture, will apply to many agricultural materials and their industrial products.* They promise relief from price cutting and that unreasonable competition which has been ruinous to much of this trade. They afford the first basis for a major campaign under the Farm Relief Bill. Unfortunately, if used alone, they might actually aggravate overproduction by raising the farm prices involved, and occasioning shifts from one branch of agriculture to another.

• ADMINISTRATION plans definitely contemplate immediate aggressive use of all three of these corrective measures. No one of them is a panacea for all farm evils. Even collectively they are hardly more than a palliative. Our overproduction headache may be relieved temporarily; but more basic correction will still be needed, even if all three of the immediate campaigns should succeed to the best of our expectations. Administration leaders frankly state this. Their very frankness is the basis of our greatest optimism.

• NEXT YEAR we shall face crop production control. For this year it probably is too late for Secretary Wallace to use that means of restricting agricultural activity, save possibly on cotton. Other crops are too far advanced to permit negotiations of contracts required to be at all useful in 1933. Later, however, some such programs may be arranged for control of milk production and the fall crop of pigs. Those, however, are problems to be faced later.

• *FOOD INDUSTRIES* presents in the following pages a partial analysis of the Farm Relief Act, its pertinent provisions, the prospective method of their application, and some possible benefits. The food industries must study all phases of that situation intensively. No one can say just what its many ramifications will be; but we can know now that they will be important to all of us.

• ADMINISTRATION PLANS afford industry the greatest opportunity in many years for self-service. Constructive, forward-looking, sincere cooperation within industry groups will be necessary. The reward will be stabilized business with assured opportunity for profit. The penalty of failure to cooperate sincerely and fully will be a bureaucratic overlordship of almost unthinkable completeness.

• TRADE ASSOCIATIONS will be the medium of cooperation. Any division of the food industries which is not adequately organized and staffed with men of high caliber should move toward such organization immediately. Prompt action is just as essential as sincere cooperation. The inducement is sufficient. The industry has ample ability. There is a possibility for great things for the food industries from this program.

• THE FOOD INDUSTRIES can at once do all, and more, than other industries are expected to do under the industry-government partnership program as established by the National Industrial Recovery bill.

Industry "Agreements" The First Result of

FARM RELIEF by government action is interwoven with new problems for industry. Every part of manufacturing and distributing business, especially every food industry, must now give thoughtful study to the program planned by the Department of Agriculture under the Farm Relief Act of 1933. This new legislation is going to be aggressively and promptly administered.

The act includes numerous provisions regarding general inflation. It also provides for refinancing of farm mortgages. All of those matters are of great importance to business generally. The farm mortgage refinancing may do much to restore agricultural buying power, but all such questions are largely detached from the true agricultural relief measures of importance with respect to the food industries.

Cotton Option Plan

Those interested only in the manufacture of food need not give great attention to the cotton option plan. Certain principles of farm relief, however, are made clear by the cotton program; and it deserves brief outline here. Cotton producers are asked to curtail acreage. Their reward is not to be rental, as for other basic commodities, but a special option to purchase government cotton. This promises to be a major factor in restoring prosperity to the South, an area perhaps in the worst economic situation of all, which likewise should normally buy $1,100,000,000 of Northern foods and foodstuffs.

Commodity Benefits

For agricultural commodities other than cotton, Congress provides two distinct types of corrective measures: production curtailment and industry agreement. The first of these applies only to six named "basic agricultural commodities": wheat, rice, field corn, tobacco, hogs and milk.

All agricultural commodities are subject to the second type of corrective treatment. Hence every manufacturer must assume that his business may be involved directly under industry agreements and trade licensing, even though it has no concern with any of the named "basic" commodities. There has been much confusion in Washington and elsewhere on this point. The arrangement of the act as passed by Congress encourages such confusion. But administratively the idea of "industry agreements" is entirely distinct from crop production control, and extends to all phases of the food business.

Policy Declared

Congress declared at the outset of this legislation its policy to be:

(1) The reestablishment of farm prices for agricultural commodities on a basis equivalent to the pre-war status, measured by relative buying power; (2) approach to such purchasing power of farmers as rapidly as feasible; and (3) protection of the consumer's interest by preventing farm prices from taking a greater percentage of the consumer's retail expenditure than in the earlier "base" period.

It is extremely important to remember that *absolute prices are not fixed.* It is only the *relation* between the price of things which farmers produce and sell and the price of the things which farmers buy that may be used under this law as a guide. For all commodities except tobacco the base period is the prewar August, 1909, to July, 1914. For tobacco the base period is August, 1919, to July, 1929. For each commodity the test of the need for relief is the ratio between the farm sales price of that commodity in the base period and the cost to farmers of the goods they then commonly purchased. In other words, Congress' ambition is to have wheat, corn, rice, etc., trade per bushel for as many shoes, shirts, mowers, shingles, etc., as formerly. It is, in effect, a variation of the idea of the Irving Fisher commodity dollar.

Production Control

The first weapon forged for the use of the Secretary of Agriculture was the authority to curb agricultural production of basic commodities. In order to accomplish this objective the Secretary is given authority with respect to cotton to offer options. In the case of all the other basic commodities there is to be an agreement to compensate farmers individually with money payment as a consideration for their reduction in output.

Elsewhere in this same act Congress fixed general inflation provisions affecting the gold equivalent of the dollar, authorized limited monetization of silver, and provided for other general inflation efforts. If these other efforts affecting all goods should raise the prices of agricultural commodities relative to industrial commodities rapidly, or should raise the absolute level of agricultural prices sufficiently, then all of the permissive parts of the act presumably will be inoperative. Actually already there has been within the past few months some effect of this sort.

Certainly every commodity price change, whether affecting agricultural goods or other industrial products, enters to modify any quantitative calculations to be made. *Great emphasis should be placed on this in any thinking, because those who have attempted to interpret the legislation in absolute figures ignore these interlocking changes and thus develop correspondingly erroneous views.*

Acreage Reduction

The way a reduction in the producing acreage may be worked out can best be illustrated with respect to a specific commodity—wheat, for example. But before considering that commodity, it is important to bring out again the general principle—this is only a *permissive* feature of the law. In fact, it is not likely to be used this year.

Now for the wheat example. Let us use specific figures. Assume that the domestic consumption of wheat is about 600,000,000 bu. per year. Assume that the typical year's crop is 800,000,000. Assume also, which is probably true for the present, that we shall export very little wheat from this year's and next year's crops, because foreign buying of American wheat seems to have completely disappeared. Then obviously at least 200,000,000 bu. curtailment is essential, or we shall have a further rise in the stocks for carry-over.

On such a basis, the Secretary would have to secure acreage curtailment equivalent to 200,000,000 bu. of pro-

Are Likely to Be Applying Farm Relief

duction. And he would have to find some industries on which to place the processing tax to reimburse the U. S. Treasury for the rental of the land so rendered idle. Furthermore, he would have to distribute equitably his contracts for acreage curtailment among the states, the counties and the individuals—obviously a complicated job.

The procedure probably will be something like this (if this authority is used at all). The 200,000,000 bu. of curtailment desired is about 25 per cent of a typical year's production. The contracts for acreage curtailment would be of the same order of magnitude. The Secretary would say in effect to the farmers, "You cut your acreage by 25 per cent and I will rent the idle land. The rental which I pay you will about equal the income that you would have had by selling your wheat at the agreed fair farm price, assuming an average yield characteristic of your land."

About 64,000,000 acres of wheat land are involved. Let us say that 16,000,000 acres are expected to be under contract. The average yield of wheat land is a little over 12.5 bu. to the acre. The curtailment to be expected would, therefore, be just the wanted 200,000,000 bu.

Processing Tax

To secure money to pay the rentals there would be wheat-milling taxes. Under the procedure defined by the law for fixing the "fair exchange value" of wheat, one might find 90 cents per bushel as approximately the answer. And the Agricultural Department might find that the farm price prevailing for such wheat was 60 cents. (These are prices on the farm, not market quotations.) The law says that the difference between these two, or 30 cents per bushel, may be imposed as a processing tax. Suppose that we should tax 450,000,000 bu. at that rate. Obviously there would be an income of $135,000,000.

On an average the $135,000,000 divided among owners of 16,000,000 acres retired from production would give about $8.50 per acre as rental to the farmer. Conceivably, the Secretary might decide to pay this rental at a flat rate. That is unlikely. Those retiring good acreage of high productivity certainly should get something more than the man who retires poor land from use. The Secretary is likely to rule in a manner that will take this into account.

One specific plan that has been proposed to him is about as follows: Let us assume that $8.50 per acre is to be the average. Let us assume that the average wheat acre produces 12.5 bu. The rental would, therefore, be about 68 cents per bushel of curtailed output. In other words, on this scheme the contracts made by the Secretary with individual farmers could say in effect, "We'll guarantee you an income from the U. S. Treasury equal to the real value of the wheat typically grown on the land which you keep idle at our request."

Other Commodities

The processing tax on wheat millers may be 30 cents per bushel purchased, and there probably would be a uniform per bushel tax on the processors, whether they made flour, breakfast food or other product.

In the case of other commodities the taxing scheme is not so simple. Take milk, for example. Just to suppose a figure, let us assume that 20 cents per 100 lb. of milk processed must be imposed as a tax in order to raise the money estimated to be necessary. Would this amount be imposed uniformly on all milk users? And is the pasteurization of milk "processing"? Is a percentage of the average price of milk better than a uniform number of cents per 100 lb.? Should the tax imposed vary in different regions, or should it be uniform throughout the country? Any thoughtful person can ask a dozen more questions equally unanswerable at the moment.

It probably is safe to assume that the Department of Agriculture will recognize difficulties in a uniform tax on milk sales. A tax of 20 cents per 100 lb. on the city distributor of fluid milk would be much less burdensome than the same charge on the butter maker. To equalize as between the different users it will be much better, therefore, to say that approximately 15, or 10, or 20 per cent, as the calculation may show is proper, is to be added to the milk user's price as a tax. Then the tax is not likely to occasion any very great change in the distribution of usage of milk as between fluid milk, evaporated milk, cheese, ice cream, butter and the other major markets. This last objective of maintaining normal flow is a definite and important part of the intended program.

In the case of corn, still a different complication arises. The major processor of corn is the hog, but obviously you cannot tax him or his owner. They are needing to be relieved, and hogs are named as a basic commodity which in itself must get tax benefit. And when one starts to impose a tax on the processor (slaughterer) of hogs, he must also impose it on those who kill cattle, sheep, lambs, and other competing animals for meat production. This authority is definitely provided for in the law. Furthermore, the policy of the department is definitely toward this distribution of the tax burden on all *competing* processors.

And there is to be a tax also on imported commodities, which might otherwise more favorably compete with the domestic products. Any imported materials competing with the products from corn or hogs or rice or the other basic commodities will share the burden.

Right here one meets interesting questions. Will cottonseed processors be taxed because they make an edible oil that competes with lard? Will imported fats and oils also bear their share of the burden, even though they are not either corn or hog products? The questions are large ones. They are still unanswered. The department is only beginning to sense the difficulty of answering. Everybody involved hopes that this part of the farm relief effort need not be undertaken this year.

Industry Agreements

Instead of using production curtailment as a weapon, the Secretary is, under this law, given an alternative authority. This centers around the idea of entering into agreements with "pro-

cessors, associations of producers, and others engaged in handling in the current of interstate or foreign commerce any agricultural commodity or product thereof." Notice particularly that this provision is not limited to the seven named basic commodities. It may apply to any goods of agricultural origin. Some think it may even apply to forest products! And certainly it does apply to derived commodities such as leather, shoes, textiles, clothing, and a multitude of other goods that in trade are never thought of as "agricultural" in nature.

And then the Secretary is given still further authority in this connection. He may issue licenses to anyone producing, processing, or dealing in any of these goods, *"or any competing commodity or product thereof."* This means almost everything. And the licenses which he issues may prescribe, regardless of anti-trust laws, for everything imaginable about the businesses involved. They may include requirements as to prices; they certainly will include the prohibition of unfair practices in trade, selling below cost and cut-throat pricing. And the Secretary may suspend a license, of course after notice and hearing, and there is a fine of $1,000 a day on anyone who operates without a license. There are plenty of teeth in this part of the law, and the authority given to the Secretary is more sweeping and more positive than any authority at any time proposed for the Secretary of Labor under the so-called Perkins plan.

Washington, at the time of this writing, believes that this industry agreement and licensing program is to be used instead of the production curtailment program. Under it quite a different set of conditions may develop, but the ultimate objective is the same—namely, the raising of farm prices on agricultural material. Already one of these projects is under active consideration. The discussion of the Chicago milk price illustrates what is likely to develop generally.

Milk Control

At once on approval of the Farm Relief Act by the President, Secretary Wallace announced that he was going to solve the Chicago milk-shed trouble to eliminate further cause for armed controversy. Apparently he is starting at the two ends of the situation and hopes to meet himself in the middle. At least unofficially it is announced that the Chicago retail price of fluid milk is to be raised from 9 to 10 cents. It is also definitely promised to the farmers that they are going to get more for their milk at the producing points.

But a town increase is hard to get back to the farm by any voluntary plan. Here enters the compulsion of the licensing program. The majority in the Chicago area are asked to formulate their recommendations. If these seem to the Secretary to be fair and reasonable, he will compel the minority of each interested group to conform to the majority's plan. For example, if one or two purchasers of milk for canning are at outs with the majority, they will be told, "either conform or we will license your whole trade, and you will not get a license without being compelled to conform." We expect that under such circumstances a recalcitrant minority will become docile and quickly agree with the majority's scheme.

Milk products dealers are going to be controlled, too. It is expected that all wholesalers and big retail purchasers, like chain stores, will soon be asked to make their recommendations. Here again if the ideas of the trade please the Secretary he will virtually order them into effect. And to please him there will have to be a definite understanding that the retail price of the canned milk, for example, is to be some unnamed percentage (10 per cent is the talk) above the wholesale purchase price. Of course, the wholesale purchase price will not be absolutely uniform. Hence the unfortunate buyer who pays more than he should at wholesale cannot with impunity add this mark-up. His competitors are likely to take away his business if he does. The competitors with a 10 per cent mark-up from a clever purchase will obviously be fixing a minimum price, and the price will rise above this minimum according to the judgment of the retail store or group of stores as to how much they can get under competitive trade conditions then prevailing.

It is understood, of course, that throughout all this milk program there will be definite agreements as to what the farmers and the farm producers' associations get for their milk from each principal class of users. The fact that the evaporated milk group has promised, for the present, a bonus of 20 or 25 cents per 100 lb. above present prices for milk, calculated on butter and cheese markets, will indicate that about that same rise in milk price that is paid to the farmers may be expected. Of course, when farmers also get this 20 or 25 cents more from butter and cheese people, the evaporators will no longer pay as big a bonus. There will then undoubtedly be merely a new equalization of purchaser prices as between the major milk using groups. The competitive relation between the various milk products will thus—so theory says—be undisturbed.

Gains Expected

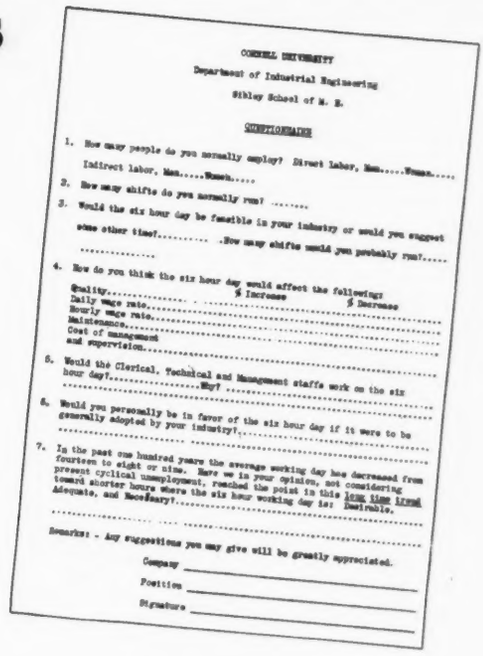
As frequently emphasized above, no one can tell at this moment, least of all Secretary Wallace himself, just what actions are to be taken or when they may be expected. There are a few objectives of this economic war that can, however, be clearly discerned as marked on the map of the general staff. It probably is not too much to assume that with the tremendous power of this new law in the hands of an aggressive and seemingly fearless executive, we may expect at least the following objectives to be reached soon:

1. Farmer strikes will stop.
2. Farmers will be paid higher prices for all commodities in which real distress conditions can now be shown.
3. Purchasers of these farm commodities will be compelled by the licensing and trade agreement sections of the law to conform with necessary plans of this sort.
4. Voluntary agreements on the part of majorities of these industries can be expected. Compulsion will follow for minorities and may even be used for majorities if whole industries are laggard in their ideas under this new ideal of public relations.
5. By the new trade relations between farm producers and first purchasers, some commodity price plans may become complete. The more that can be perfected with that simple system, the better from the administration point of view; also the better from the public point of view.
6. In many cases it will not be feasible to stop with these producer-first-purchaser programs. Processors other than first purchasers will then be the next group involved. They will be subjected to industry agreements, and a licensing program, if necessary.
7. If the prices "controlled" by this plan, which may be fixed regardless of anti-trust laws, do not then serve to stabilize the rest of the business, the dealers come in for supervision. They will be controlled by the licensing program as described.
8. Even if dealers conform in other ways, without licensing, they are certainly going to be brought within the department's regulatory area wherever it is believed that selling below cost, cut-throat competition, unfair practices in trade or unreasonable use of loss leaders still continues. These objectionable features, whether found among wholesalers, among retailers or with chain store supervision, are likely to be largely eliminated for any commodities having any substantial agricultural interest.
9. The objective in all of the previous plans will be sought with a minimum of disturbance of inter-commodity competition. The effort will also be to avoid any decisions that favor one section, one division of trade or one stage of merchandising as against another. But even if such relative distortions do occur, they will not be allowed to stand in the way of vigorous action.
10. Milk is likely to be the first commodity handled under the industry agreements program. Canned milk is likely to be the first processed commodity covered by licenses, or by voluntary agreement if 100 per cent adherence to majority proposals is gained.
11. Among the important imported commodities to be considered will certainly be sugar. This has extreme importance for the administration, because Cuban troubles become problems of the United States armed forces whenever Cuban policing proves inadequate. Other imported goods are likely to be affected only as they influence major domestic agricultural products.
12. Trade associations are going to be the vehicle through which the department will work, so far as possible. But trade associations of the secret price-fixing variety will not have consideration. Only those which in fact, as well as in claim, prove aggressive and public-spirited in their cooperation will remain as a part of the picture. The Secretary has such ample authority that he can work without using any trade association which may prove to be an obstacle rather than an aid to his efforts. A new set of ethical principles guiding trade-association practice may be needed in some quarters.

And finally, anything can happen; and to any commodity; and with any suddenness; and with abrupt changes from time to time as needed modification is discovered by the Secretary.

What Industry Thinks Of the Six-Hour Day

By MYRON A. LEE and PAUL H. SETZLER
Cornell University, Ithaca, N. Y.



CORNELL UNIVERSITY
Department of Industrial Engineering
Sibley School of M. E.

QUESTIONNAIRE

1. How many people do you normally employ? Direct labor, Men.....Women.....
Indirect labor, Men.....Women.....
2. How many shifts do you normally run? .....
3. Would the six hour day be feasible in your industry or would you suggest some other time?..... How many shifts would you probably run?.....
.....
4. How do you think the six hour day would affect the following?
Quality..... % Increase % Decrease
Daily wage rate.....
Hourly wage rate.....
Maintenance.....
Cost of management and supervision.....
5. Would the Clerical, Technical and Management staffs work on the six hour day?.....Why? .....
.....
6. Would you personally be in favor of the six hour day if it were to be generally adopted by your industry?.....
.....
7. In the past one hundred years the average working day has decreased from fourteen to eight or nine. Have we in your opinion, not considering present cyclical unemployment, reached the point in this long time trend toward shorter hours where the six hour working day is: Desirable, Adequate, and Necessary?.....
.....
Remarks: - Any suggestions you may give will be greatly appreciated.
Company _____
Position _____
Signature _____

● The administration has been considering the 6-hour day for industry. In anticipation of such a move, the department of industrial engineering at Cornell has studied its probable effect on industry. In presenting here an excerpt from the larger report, we are aware that many questions and disagreements will arise. These pages are open for further discussion by readers whose comments reach us in time for the next issue.—The Editor.

AMONG industrial leaders there seems to be very little serious objection to a shorter week of some sort. However, there is a feeling that arbitrary legislation might work a hardship not only upon the owners and management of some particular industries, or divisions of industries, but upon the workers concerned as well. Industrial leaders realize that legislation of some sort is almost a requisite, for if a few employers adopt, say, a 30-hour week they might be competitively at the mercy of other rather unscrupulous employers who would still operate on the basis of a 50-hour week. It is to eliminate this possibility that legislation is needed.

The difficulty is to frame this legislation so that it will accomplish the desired end without disastrous results to individual groups of employers and employees. A given length of working day, for instance, might be feasible and desirable in one department of a certain plant, and almost disastrous if applied to another department in the same plant.

With this end in view, questionnaires (shown on this page) were mailed to those in charge of the management of twelve hundred industrial plants. The number selected from each class of industry was determined in accordance with the proportionated number employed in each class as shown by the 1930 census.

An unexpected majority of manufacturers felt that the time had arrived for a definitely shorter working week. Many of them were in favor of a six-hour day. Most of those opposed to a six-hour day based their opposition upon operating conditions in their particular line, which made a six-hour day difficult from a management and operating point of view, specific instances of which will be cited later.

In the main, those replying were extremely open-minded and apparently were principally interested in what would be best for the workmen. However, the consensus of opinion was very definitely in favor of a solution varied and flexible enough to fit the extremely varied conditions of operation and demand for products.

A tabulation of replies received is shown on page 205.

Number of Shifts—The number of shifts employed in the companies answering the questions contrasted to the number that would be required under a six-hour day is shown in the following tabulation. Under normal conditions in the past few years:

63 companies ran 1 shift
7 companies ran 2 shifts
24 companies ran 3 shifts

If the six-hour day were in force:

48 companies would run 1 shift
26 companies would run 2 shifts
5 companies would run 3 shifts
23 companies would run 4 shifts

The total number of companies does not agree in each case, because in some cases both questions were not answered and also some companies ran some departments one shift and some more than one shift. The number of companies who would change to a two-shift basis with the advent of the six-hour day (from 7 to 26) is significant.

Lower Unit Costs Possible—If equipment is used on two 6-hour shifts instead of one 8-hour shift, the machine rate unit-charge may be reduced, and at the same time operators' wages may be increased, yet total unit costs may actually be lowered.

Of course, if this change were made with no increase in total output, it would involve a reduction in plant. In any event the economic situation would have to be evaluated for each plant and perhaps drastic action taken to reap the possible benefits from the change. Obviously such a unit cost reduction would hold true only in some industries; it would not apply to a blast furnace, for instance.

The replies to Question 3 indicate that approximately twenty companies appreciated the economic aspect of the problem and in the event of a change to a six-hour day would also change to two shifts. It is surprising that more of them did not take the same attitude. Of course, the change would involve many perplexing problems in reducing plant and adjustment management, supervision and clerical work.

Commenting on the effect of fixed investment, one manufacturer made the following observation: "There is one angle of this problem of the six-hour day which I believe should be given consideration. This is the matter of the fixed investment. With the demand fluctuating as it normally does and operating on a six-hour day, an increase in fixed investment would be necessary to meet the peak load. It would be possible to offset this necessary increase of fixed investment by operating several six-hour-day shifts. This, however, introduces the social problem of forcing employees to work other than normal hours."

Feasibility of Six-Hour Day—It was felt by 71 manufacturers that the six-hour day was feasible for their condi-

This article is briefed from a larger report that considers all industry.

tions. Of the 33 who felt that the six-hour day was not feasible, only a few objected to the basic principle of a shorter week. Most of the 33 felt that a six-hour day would be impossible or undesirable because of the obstacles which would be encountered in their particular field.

Effect on Day Wage and Hourly Wage—If purchasing power is to be maintained, it is evident that a change to a shorter day must not be accompanied by any drastic cut in day wages. Many of those replying realized this necessity, as evidenced by the fact that 30 expected the day wage to remain the same. A majority (55) expected the hourly rate to be increased. A study of the replies shows that many expected that the hourly rate would be increased, but not enough to make the day rate equal to the previous day rate for a longer day.

There was a general feeling on the part of those who predicted a decreased day-wage that this decrease would be only temporary and that eventually a way would be found to increase the day-wage even above that formerly paid.

Many industrialists realize that, if purchasing power is to be maintained and increased, *real* wages must be increased. This is no altruistic phantasy, but hard-headed common sense. Neither is it at all impossible of fulfillment. What is involved is a drastic rearrangement of the division of the sales dollar. More must go to labor and less to sales, distribution and return on invested capital.

It is maintained that selling and distribution costs are largely composed of salaries and wages, and that in an honestly managed business the return on invested capital is not now too high. All of which is granted. The reapportionment of the sales dollar must be accomplished in another way.

The methods which have made our production so enormously effective must be applied to administration, distribution and the use of invested capital. When and if this is done it will be quite possible to reapportion the sales dollar so that purchasing power will be enormously increased.

Would Improve Quality—As was to be expected in our highly mechanized age, where quality is largely dependent upon machine accuracy and carefully specified and inspected materials, with a continuous checking during production by highly skilled inspectors, most of the replies indicated that no change in quality would be expected due to a change to a six-hour day. In some lines where fatigue might affect quality it was felt that a less fatiguing six-hour day might result in improved quality. In fact this has been the result in some plants now operating on the six-hour-day basis.

Those who felt that quality would suffer, mainly based this prediction on the assumption that a workman under an incentive system would try to maintain a higher pace during the six-hour day and as a result the quality of his output would be impaired.

Less Maintenance Expected—If the maintenance force also is to operate on a six-hour day, it would be logical to expect maintenance costs to rise. This view was taken by 41 of those replying. However, with careful planning and supervision of maintenance work and a consequent increase in the effectiveness of the maintenance staff, maintenance costs might remain the same or even be reduced. A majority of those replying seemed to be of this opinion. One company which is now operating on a six-hour-shift basis states, regarding its maintenance costs: "Due to the fact that the greater portion of our work is in the nature of machine tending, the six-hour day has brought about, due to lessening of fatigue, a noticeable decrease in accidents and a great decrease in the severity of those which do occur. Accidents often cause damage to machines as well as to workers, and therefore the decrease in accidents accompanied with better care and attention of machines has effected a decrease in maintenance costs."

Management Cost May Rise—It is quite usual to consider management as a fixed cost, and this habit of thought may account for the twenty replies indicating a belief that management costs would remain the same. Those who expected the cost of management to increase, generally based their belief on the feeling that with a six-hour day supervision costs would necessarily be higher. This would be true particularly if a plant changed from one shift to two six-hour shifts.

Clerks Must Work Longer Hours—In a discussion of clerical staffs an anomalous situation is immediately encountered. For years it has been customary for the clerical staff to enjoy shorter hours than the workmen in the shop. As the working hours in the shop have gradually been reduced there has been an increasing number of plants where shop and office work the same number of hours, but still the practice of shorter hours for the clerical staff has prevailed.

It now appears that with a six-hour day for the shop imminent, the vote is *62* to *27* in favor of the clerical staff working longer hours than the shop. Most employers apparently do not feel

How Six-Hour Day Will Affect Operations in Nine Trades

Group		Direct Labor	Indirect Labor	Shifts Now Run			Six-Hour Shifts Would Run				Feasibility of Six-Hour Day		Day Wage		Hourly Wage			Quality			Maintenance			Management			Clerical Staff		Personal Opinion		Trend		Shorter Week	Now on Six-Hour Day
				1	2	3	1	2	3	4	Yes	No	Same	—	Same	+		Same	+	—	Same	+	—	Same	+	—	Yes	No	Yes	No	Yes	No		
Metal Working	No.	15,813	2,136	16	0	4	20	2	0	4	16	5	5	6	3	11		10	5	3	9	7	3	5	3	1	6	12	13	7	11	2	3	1
	%	.....	.....	80	0	20	77	8	0	15	76	24	45	55	21	79		56	28	16	47	37	16	56	33	11	33	67	65	35	85	15	11	..
Miscellaneous	No.	5,557	1,066	13	0	1	6	4	1	1	10	5	5	6	3	8		8	2	1	4	6	2	2	9	0	4	8	9	4	7	6	1	4
	%	.....	.....	93	0	7	50	33	8	8	67	33	45	55	27	73		73	18	9	33	50	17	18	82	0	33	67	69	31	58	42	6	..
Iron and Steel	No.	36,444	4,071	6	2	5	3	3	2	6	13	1	5	6	3	10		9	2	1	7	6	1	1	12	1	4	10	10	3	7	5	1	..
	%	.....	.....	46	16	38	21	21	15	43	93	7	45	55	23	77		75	17	8	50	43	7	7	86	7	29	71	77	23	59	41	7	..
Paper and Printing	No.	2,415	365	6	0	1	1	3	0	1	5	5	3	2	1	5		3	1	2	3	3	0	0	5	0	1	5	3	5	3	2	2	1
	%	.....	.....	86	0	14	20	60	0	20	50	50	60	40	17	83		50	17	33	50	50	0	0	100	0	17	83	37	63	60	40	20	..
Chemical	No.	24,095	1,851	5	1	7	3	1	1	7	7	5	2	9	5	5		7	2	1	5	2	1	2	6	1	4	8	8	3	7	4	2	2
	%	.....	.....	38	8	54	25	9	9	58	58	42	18	82	50	50		70	20	10	63	25	12	22	67	11	33	67	73	27	64	26	14	..
Textile and Clothing	No.	26,066	1,191	11	4	2	3	8	1	2	8	6	3	10	6	6		9	2	3	7	5	0	2	9	0	1	11	7	5	7	8	1	..
	%	.....	.....	14	57	29	21	57	8	14	57	43	23	77	50	50		64	15	21	58	42	0	36	64	0	8	92	58	42	47	53	6	..
Foods	No.	5,130	91	3	0	2	2	1	0	2	3	2	3	1	1	3		2	2	0	1	3	1	2	3	0	0	3	3	1	2	1	..	2
	%	.....	.....	60	0	40	25	50	0	25	60	40	75	25	25	75		50	50	0	30	60	30	40	60	0	0	100	75	25	67	33	..	..
Electricals	No.	25,540	2,240	10	0	0	7	1	0	1	8	2	3	7	4	6		7	3	0	3	6	1	1	8	1	7	2	9	1	6	0	3	..
	%	.....	.....	100	0	0	78	11	0	11	80	20	30	70	40	60		70	30	0	30	60	10	10	80	10	78	22	90	10	100	0	25	..
Automobiles	No.	10,750	600	3	0	0	3	0	0	0	1	2	1	2	1	1		2	1	0	2	0	1	2	1	0	0	3	1	3	1	2	..	..
	%	.....	.....	100	0	0	100	0	0	0	33	67	33⅓	66⅔	50	50		66	34	0	67	0	33	67	33	0	0	100	25	75	33	67	..	..
Totals	No.	151,810	13,615	63	7	24	48	26	5	23	71	33	30	49	27	55		57	20	11	41	38	10	20	56	4	27	62	73	32	45	30	13	10
	%	.....	.....	67	7	26	47	25	5	23	68	32	38	62	34	66		70	25	5	46	43	11	25	70	5	30	70	72	28	60	40	10	8

that the clerical staff can do a real day's work in six hours, and two shifts for clerical work is inconceivable.

On the other hand, a few replies indicated a belief that the six-hour day for clerical work should arrive before it was considered for the shop. One manufacturer states: "I am not so sympathetic with the six-hour day, although I believe that sooner or later it will come. I believe that it will come first in the offices and that it will be a long time before it comes to manufacturing plants." In another reply we find this statement: "In case such legislation as a six-hour day was brought about, it should not apply to the office or clerical help—at least not for the time being. Applying it to the industry in the beginning would be our recommendation."

General Opinion Favorable—The summary of answers to Question 6 discloses the fact that by a vote of 73 to 32 the industrialists replying were personally in favor of the six-hour day if it could be generally adopted in their industry. Since many of the 32 were opposed specifically to the six-hour day, but not necessarily to a shorter week, it would be reasonable to expect little antagonism on the part of industry to the principle of legislation which should bring about a shorter day or week, provided, of course, that it were so devised as not to work hardship on particular groups.

Foods Have Special Problems—A company engaged in processing perishable foods naturally opposes legislation limiting the hours of labor to anything like six hours a day. The sponsors of the older Black bill apparently realized their problem and proposed to exempt them in the provisions of the bill.

Those processing non-perishable foods are in an entirely different position, and one nationally known company has already demonstrated that in its case the six-hour day is very satisfactory indeed.

After two years of operation on the six-hour-shift basis this company writes: "An important factor is the improved health record of employees under the six-hour day . . . we find that there is 20 per cent improvement in the health of employees. Furthermore, there has been an even greater improvement in the lost-time accident record. Under the six-hour day there has been a decrease of 32 per cent in the number of lost-time accidents in the plant and 38 per cent decrease in their severity." Paying practically the same wages for six hours as were previously paid for eight, this company reports *"a decrease in direct labor cost of 15 per cent per unit and a decrease in burden costs of 13 per cent per unit."* The employees, management and stockholders of the company all agree that the six-hour-shift basis of operation is desirable and has operated successfully, and no change whatsoever is contemplated.

Widespread Effect of Six-Hour Day—Many replies indicated that industrial leaders are interested in the broad aspect of the problem as well as in its immediate effect upon their own industry. In any discussion of legislation arbitrarily fixing the length of the working day or week, due and careful consideration should be given to its effect upon the country as a whole.

A large electrical equipment manufacturer views it in this manner: "Any step taken at this time which raises the cost of manufactured goods is a step in the wrong direction. It widens the gap between the price of manufactured goods and agricultural buying power, and thereby increases unemployment. It is obvious that a farmer and his hired man with a cash income of one dollar a day are not going to keep people busy in the industrial centers making goods with labor at five dollars a day produced in buildings built with labor at from eight dollars a day upward.

"Isn't it obvious that when certain groups or individuals, through inequitable distribution of pay, are able to take out of production more than they put in, other groups are compelled to take less? At this point distribution breaks down and unemployment begins."

Another view of the legislation was stated in this way: "If a definite reduction were made according to a fixed law, I am very much afraid that there would be an incentive established to train an excess of skilled labor which would later on result in even more discomfort and unemployment over a period of time than is now encountered, and that this situation would be accompanied by increased overhead costs due to even more excess equipment than is now in use."

The personal opinion of the vice-president of a large milling company is: "I would say the six-hour day should offer an immediate relief to unemployment. There is no question in my mind but many plants will not be able to run full capacity until the purchasing power of the people materially increases. During such period, shorter hours for employees and more people given employment would relieve the situation materially. I don't believe that the time has arrived where it should be necessary for an industry to go permanently on the six-hour-day working basis."

One large farm equipment manufacturer states: "In regard to the six-hour day the writer has observed that where this system is in vogue it has a peculiar effect on the workingman. Usually he will work for one institution in the forenoon and then in the afternoon try to pick up some odd work, so that he can increase his total monthly earnings. In some cases the afternoon is spent in enjoyment, and thus the workingman incurs an extra expense which otherwise could be avoided."

The following factors to be considered were pointed out by one machine manufacturer: "There is much more to this subject than, How much work can a man stand, or, How many hours' work will produce the needs of the human race? You have to consider the habits of the race, which change slowly. You must consider the laws of the country, which make many forms of cooperative effort a crime. You must consider the social and economic consequences of having one set of workers employed 30 hours per week while many more work 40, 50 and 60 hours or more."

A leading leather manufacturer states: "We believe that prosperity cannot be restored by any such drastic limitation of hours of employment, but can be restored only through a resumption of consumption of goods. We understand, of course, that in the old days of twelve hours' or more employment, the worker had practically no leisure time in which to consume the products of other industries, but we do not believe, especially in our industry, that he can produce enough in six hours to buy more than the bare necessities of life."

The replies indicated that many felt that legislation limiting the minimum wage was fully as necessary as that of limiting hours of work; in fact, some of those replying felt this question was of paramount importance.

One large corporation states: "What we believe, however, more important than even the six-hour day is a minimum wage scale. Manufacturers have opposed the six-hour day, but not the minimum wage scale. In fact, that is welcome legislation if brought about nationally. If that were brought about, the hours would automatically be reduced, even if there were no legislation governing same."

Conclusions

1. Most manufacturers believe that it would be possible to improve employment conditions by a widespread adoption of a shorter week and (or) a shorter day.

2. With a shorter day or week it would still be possible to produce an adequate supply of goods.

3. A drastic reorganization and readjustment must occur which will tend to eliminate the business cycle, stabilize employment and give workers adequate purchasing power.

4. In some manner a universal minimum wage must be established to prevent unscrupulous employers from grievously exploiting labor.

5. Any law limiting the hours of labor must be so framed and enforced that it shall not occasion undue hardship upon any group of employers or employees because of the operating conditions peculiar to their particular activity. Also the laws must operate to improve the standard of living conditions of the country as a whole.

Sugar

Commodity? Ingredient??

By WM. LUDWELL OWEN
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Baton Rouge, La.

Each ingredient plays its particular part no matter in what quantity used. If all are chosen wisely, many of your production problems are solved. Selection of any one on a price basis alone is not wise.—The Editor.

SUGAR as a commodity of trade is defined in general terms. But as an ingredient, it is called upon to impart definite properties and qualities to a manufactured product, and, to do so, must be selected on a much different basis from that as a commodity of trade.

During the economic depression of the past few years the sugar markets of the world have been in such an unfavorable condition that the industrial user of sugar has been greatly confused. Also the attitude of the public would lead one to believe that color, crystal size and sweetness are the only standards of quality applicable to sugar.

It is a strange state of affairs that at both extremes of the range of market prices there appears to be an irresistible tendency among buyers to forget standards of quality and to buy anything that sells at a slightly lower price. In 1920 and 1921, when the supply was inadequate to meet the demands and it was selling at a price as high as 22 cents per pound, sugar was brought into this country from every corner of the sugar world and dumped on our domestic markets. Sugar of every color and grade and made by every conceivable process known to man was regarded as fit for human consumption and eagerly bought by a panic-stricken public.

Today, when refined granulated sugar has been selling as low as 4 cents per pound and the buyers are discriminating to the point of demanding the last word in quality when haggling over prices, sugar is again being brought from Europe and elsewhere and sold as a distress product in our markets. Again, as in 1920 and 1921, sugars are sold only on a price basis, and all industrial users, seemingly, are striving to get the greatest quantity of sugar for their money, regardless of source or quality. They seem to have forgotten all but price and have come to regard sugar as we would so much sand or cement and have formed the habit of buying it solely on a price basis.

The purpose of this article, however, is not to censure the consumer of sugar for getting the most for his money, but to question the wisdom of the price method of selecting this essential ingredient of his manufactured product. In fact, our experience has taught us that, even when selected on a price basis, the cheapest grade has not always been used. In many cases the writer has found the most expensive grades of sugar being used for purposes where a much cheaper grade would have served just as well. In those cases, the sugar was selected on the basis of a slight preferential price over others of the same grade. A lower grade could have been used more economically and just as effectively. On the other hand, it often happens that the buyer of a low-grade sugar pays for his "penny-wise and pound-foolish" methods of purchasing.

Until a few years ago any grade of refined granulated sugar or its equivalent was considered adequate for the canning of corn and other non-acid vegetables. It is now a well-established fact that even the most highly refined granulated sugar may be unsuitable for this purpose, due to the presence of thermophilic bacteria. Chemical analyses of this infected sugar together with its appearance and physical condition may give it a perfect score, and yet its bacteriological analyses would inevitably reveal undesirable qualities for use in canning non-acid vegetables.

Another instance illustrating some of the penalties for the indiscriminate selection of sugar for industrial use came to our attention several years ago. A firm had bought a large quantity of slightly off-grade sugar to use in the preparation of invert syrups. When used for this purpose the sugar was found to have such a high ash content that ten times as much acid was required to invert it as would have been required for a normal sugar of the same grade. When this acid was neutralized, the syrup had such a high salt concentration that it was unfit for human consumption.

When considering a sugar for the preparation of simple syrup to be used in blending with highly colored materials, which would obscure any objectionable color in the original sugar, it would appear that high quality specifications might well be disregarded and that a very cheap grade of sugar might be used for this purpose. However, the problem is by no means so simple, and the greatest care must be taken even in this case. Simple syrup, unless very carefully prepared, is subject to changes in flavor due to fermentation and, as sugars may easily carry enough resistant yeast (torulæ) to cause a prompt fermentation, an objectionable flavor may develop during processing when a low grade sugar is used. Even under the best of conditions and when operating under the most scrupulous cleanliness, if the sugar contains mold fungi it may quickly undergo sufficient inversion to make it readily suspectible to the development of certain species of yeast which cause undesirable flavors.

Bursting of chocolate candy centers by both yeast and bacteria action represents another example of where the bacteriological factor is of even greater importance than the chemical analysis in the selection of the sugar. In the baking industry, there have been instances where the specific bacteriological flora of sugars have seemed to be the source of infection for "ropiness" in bread. Although the principal ingredient of bread—flour—is never sterile, the prevailing mesophylic bacterial contamination of sugar is capable of inducing a viscous fermentation, such as is typical of "ropiness."

In the opposite category are cases where less highly refined sugars may prove equally adapted to some industrial use and where the use of the higher grades is an unnecessary expense. However, even in such a case, the uniformity of the product is of great importance. The user must feel reasonably confident of being able to obtain the same product at all times of the year so that his manufactured product may be of uniform quality. This fact places a premium on the uniformity of the sugar, for in certain industries unvarying uniformity in composition and in microbiological purity are of more importance than high chemical purity.

We might extend this list of examples almost indefinitely, but those mentioned will show some of the "pitfalls" in the path of the industrial consumer of sugar who purchases on a price basis without regard for the effect of quality on the purity or keeping property of his product.

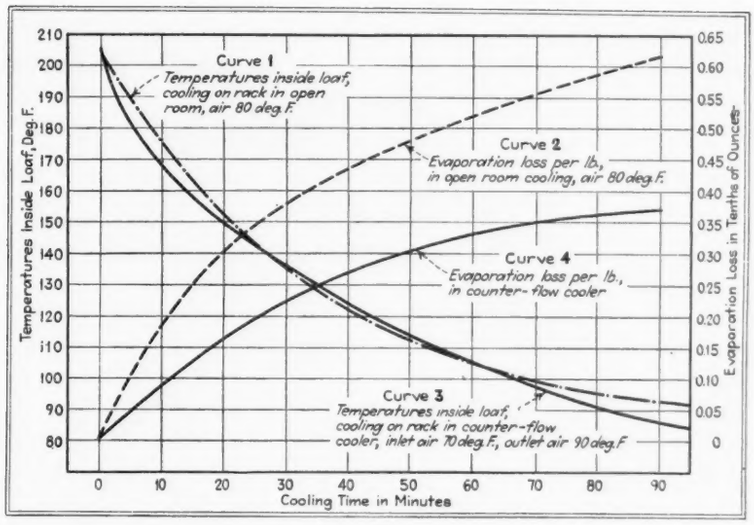

Fig. 1—Loaves of bread cooled in a counter-flow unit show a better controlled cooling rate and a lower evaporation loss than those cooled in an open room.

Air Conditioning Reduces Losses In Bakery Products

By W. W. REECE
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The W. E. Long Co.
Chicago, Ill.

SINCE its introduction in 1928, slicing of bread has made the baker realize more fully that he is dealing with a highly perishable product and that there are such things as invisible losses in his business. True, there were losses due to moisture evaporation and to mold contamination before the introduction of sliced bread, but these losses were not brought so vividly to the baker's attention until he undertook to add slicing to bakery operations.

When the loaf leaves the oven it has a temperature of slightly less than 210 deg. F., a moisture content of from 36 to 38 per cent, and no mold contamination. If it is to be wrapped unsliced, the temperature at which the loaf can be handled is higher than if it is to be sliced before being wrapped. This means that the unsliced loaf may have a shorter exposure to the atmosphere of the cooling and wrapping rooms than it would ordinarily have if cooled to 85 to 90 deg. F., satisfactory for slicing. Also, the unsliced loaf exposes at a much lower surface area from which moisture can be lost by evaporation. For these reasons uncontrolled open-rack or conveyor cooling of bread was generally practiced before the introduction of sliced bread without serious criticism. But when this uncontrolled method of cooling was continued in connection with sliced bread, it was found that losses due to mold greatly increased.

A careful study of the open-rack or conveyor method of cooling bread revealed that it involved at least three variable factors and one particularly bad condition, namely: a variable cooling time, a variable weight loss, a variable external appearance in the finished loaf, and a highly favorable condition for mold contamination.

As shown by Curve 1, Fig. 1, a loaf of white bread will cool to 90 deg. F. in approximately 90 minutes under ideal conditions of 75 to 80 deg. F. room temperature. In actual practice, this room temperature varies from 75 to 105 deg. F. according to climatic conditions such as changes in the weather and in the seasons of the year. Also, drafts or air currents have their influence, so that the cooling period actually varies from 90 minutes to 5 hours.

Any practical-minded production man can visualize what such a variation will do to a carefully planned production schedule. In most present-day, well-planned bakeries a definite shop schedule is maintained up to the discharge from the oven. With such a variation in cooling time, the schedule from the ovens on either has to be sacrificed or, in order to maintain some semblance of the schedule, the bread must be handled before it is cooled. An incidental but nevertheless an important problem in this connection is the escape of heat and moisture from the hot bread into the packing room. This adds complications to the cooling of other bread as it comes from the oven and causes discomfort to the employees.

Curve 2, Fig. 1, indicates that the average cooling loss in weight for a 1-lb. loaf averages 0.62 oz. However, studies show that in open-rack or conveyor cooling a 1-lb. loaf will lose some 0.4 to 0.8 oz. while cooling to 90 deg. F. This loss will vary in any specific bakery during the day and from day to day, depending upon the varying humidities, drafts or air currents, and room temperatures. Such variations mean that in order to insure that his loaf will meet a definite minimum weight requirement, the baker must be liberal in his scaling weight to allow for the maximum loss. In such highly competitive days as these, this factor should be under better control and this economic waste avoided.

Variations in cooling time and moisture losses influence greatly the condition of the finished loaf. The effects of these variations is indicated by checking of the crust and the shriveled appearance of the loaf, which have a direct influence on "staling" of the loaf.

Of still greater importance is the problem of mold contamination. Mold spores are present to some degree of concentration in all air and find fresh

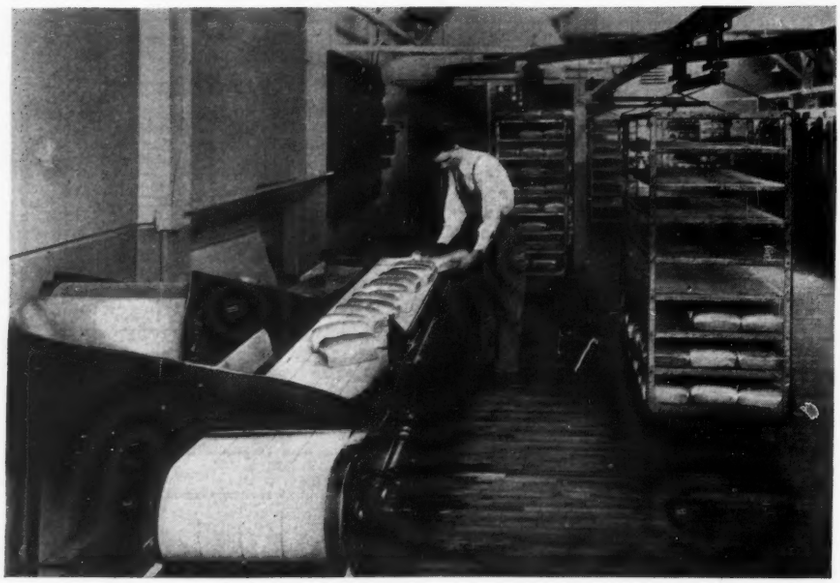


Fig. 2—Ovens in the plant of Pioneer Baking Co., Sacramento, Calif., discharge onto short conveyor belts for delivery of hot loaves to a convenient place for loading onto cooling racks of an air-conditioning unit.

bread an excellent medium for growth and reproduction. When bread is cooled and sliced in an open room under atmospheric conditions, mold spores have greater opportunities to contaminate the loaf during the longer cooling period, during the slicing operation, and during wrapping. If the loaf is wrapped while still warm—say at 100 to 105 deg. F.—it will be likely to mold in 24 to 36 hours. Moldy bread is particularly prevalent in the more humid climates, such as along Eastern and Southern seaboards. It is found to a certain extent in all climates. It is difficult to tell how great is the loss due to moldy bread, as all moldy bread does not find its way back to the baker. Too often the purchaser does not even try to find out why she got a loaf of moldy bread. She merely changes her source of supply without making any comments.

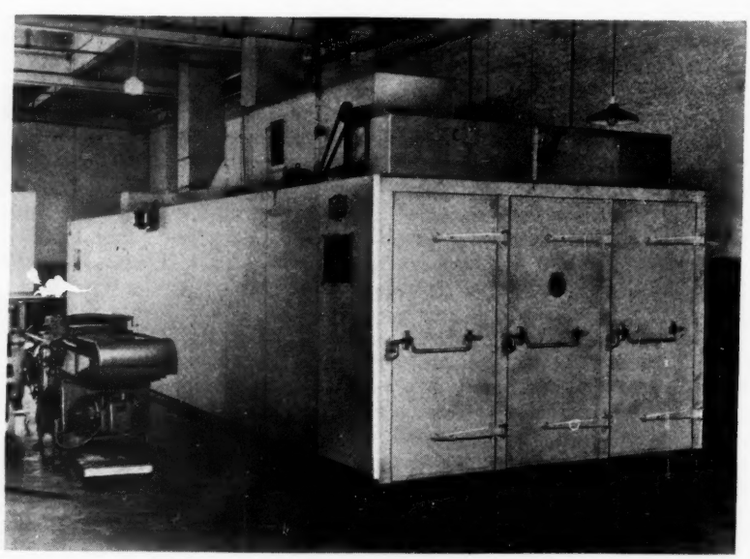
Wrapping of bread in transparent cellulose wrappers tends to keep the retailer and the delivery salesman informed on the condition of the bread and thus reduces the chances of a moldy loaf getting into the hands of the consumer. But the solution of this mold problem and of the weight losses does not lie in increased precautionary inspection nor in handling the bread before it is thoroughly cooled to 80 or 85 deg. F. Nor are the bad features of open-rack or conveyor cooling to be accepted as necessary evils by the baking industry.

As of Nov. 1, 1932, the W. E. Long Co. was granted U. S. Patent No. 1,885,142, entitled "Method of Cooling Bakery Products." The method described in the patent is the result of an intensive study of bread cooling begun in 1928 by the engineering and laboratory research divisions of this company. It provides for the cooling of bakery products in conditioned, filtered or sterlized air, and for the slicing and wrapping of the bread under the same conditions. After being tried out in numerous bakeries, it was made available to the baking industry in 1932 through license agreements with several approved manufacturers of cooling-system equipment. During the study of this bread-cooling problem it was found that most early attempts at conditioned bread cooling had used refrigeration to force rapid cooling in 30 to 50 minutes. The first cost and operation expense of refrigeration in connection with humidifier or air-washing systems kept these ideas from gaining impetus. Quick cooling in refrigerated conditioned air also had a detrimental effect on the bread. It gave "checked" crusts and a rather excessive weight loss.

As a result, it seemed advisable to reproduce natural cooling conditions—that is, to have 70 to 80 deg. F. air with relatively high humidity pass over the bread and to allow approximately 90 minutes for the cooling period. As humidifier practice now calls for evaporative cooling to within 2 deg. of the wet-bulb temperature (a maximum of 75 to 80 deg. F. in the most humid parts of the United States), the actual problem of air cooling was quite simple and could readily be done without refrigeration. Typical installations for the cooling of bread on racks in a tunnel-like room are shown in Figs. 2, 3, 4 and 5. In these installations, the racks of hot bread enter at one end of the room and move progressively forward as racks of cooled bread are removed to the wrapping machines. Outside air, being freer from molds than inside air, passes through the air washer, is tempered and cooled to 70 to 80 deg. F. temperature, and enters the tunnel at the cold-bread end. It travels counter to the movement of the bread and is exhausted at the hot-bread end, either to the outside of the plant or to be partially recirculated through the air washer. Automatic, thermostatically controlled mixing dampers govern the mixture of fresh and recirculated air and control the entering temperature of air into the system.

As the air is approximately 90 deg. F. temperature by the time it reaches the hot bread, this bread retains a uniform condition of crust. The loaves are surrounded by washed air, substantially mold-free, during the entire cooling operation and are cooled under uniform conditions the year round. Installations which include the operations of slicing and wrapping in conditioned

Fig. 4—Showing a convenient location for the slicing and wrapping machines in relation to the delivery end of a 3,000-lb. per hour cooling system in a Southern bakery.



air have required only the additional inclosure of a space around the slicing and wrapping equipment, into which conditioned air is introduced at 70 to 80 deg. F. temperature to keep such space under a slight pressure.

After several years of experimentation, with records of study and scientific tests of many installations, and after analyzing the reports of users from all parts of the country, the results of air-conditioned bread cooling show that 1-lb. loaves cool in 75 minutes, 1½-lb. loaves cool in 90 minutes and 2-lb. loaves cool in 105 minutes. Curve 3, Fig. 1, gives the time and the rate of cooling of the 1¼-lb. loaf of white bread in a counter-flow cooling system such as described in U. S. Patent No. 1,885,142. The cooling time for special breads, such as whole wheat, rye, pullman and the like, when once determined, can be maintained throughout the year with only slight variations. This means that production schedules can be maintained throughout the shop and that a direct saving can be made in the floor space and in the number of cooling racks required.

Curve 4, Fig. 1, plotted from many weight tests, pictures the average weight loss and rate of loss in air-conditioned cooling. The total loss per 1-lb. loaf is found to be substantially constant at 0.37 oz. in all installations regardless of location or climate. This means an average direct saving of 0.25 oz. per 1-lb. loaf, amply sufficient to carry the overhead expense of an installation. In a plant turning out 100,000 lb. of bread per week this conditioned cooling will average a saving of 1,500 lb. of dough per week, or approximately $27.00 in terms of ingredient cost. The weekly charges on such an installation for interest on investment, taxes, insurance and power will approximate $9.00, leaving $18.00 per week to amortize the capital investment in the installation.

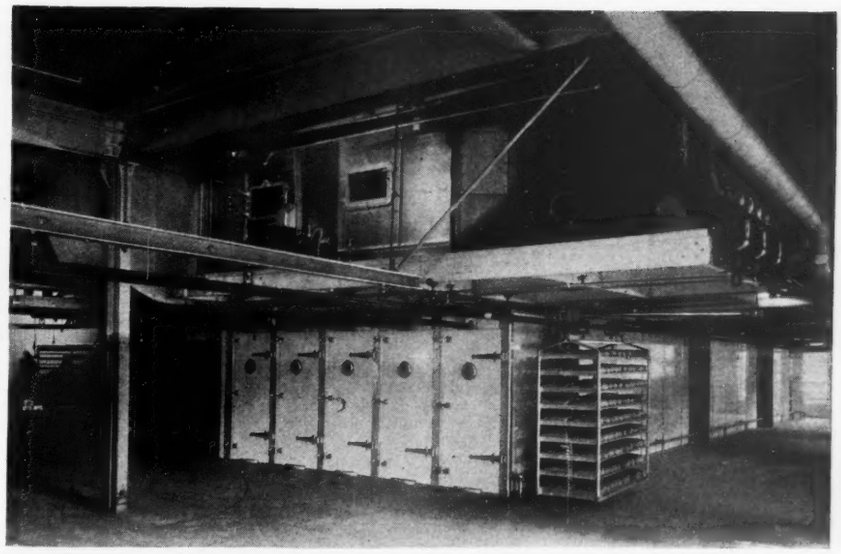


Fig. 3—A 55-rack-capacity counter-flow cooling system handles 8,000 lb. of bread per hour in the E. H. Koester Bakery, Baltimore, Md.

Bread cooled under these controlled conditions results in a finished loaf whose external appearance encourages consumer demand. This is especially true when the loaves are marketed in transparent wrappers. Also microbiologic studies on the occurrence and development of mold by L. W. Haas, W. E. Long Co.; H. G. Brouilett, American Dry Milk Institute; and others, and reports from users of air-conditioned bread-cooling systems definitely indicate that mold contamination is kept to the minimum by these installations. The usual varieties of bread are substantially mold-free for as long as a four-day period. Special breads containing unusually rich ingredients may require ultra-violet-ray sterilization to keep them mold-free for seven to ten days.

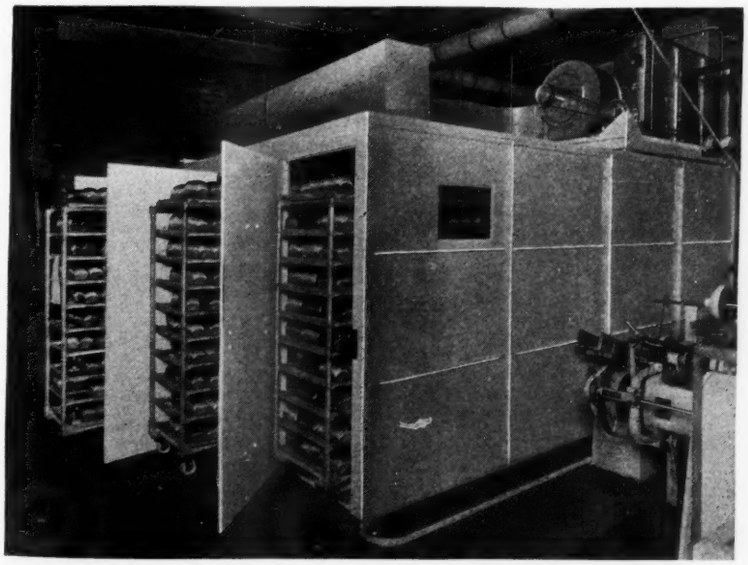
Although almost complete elimination of mold is one of the greatest advantages of conditioned cooling of bakery products, there are other benefits. Among these initial advantages are: a marked reduction of heat in bakeshops, more orderly and efficient wrapping-room operation with the racks of bread following a definite systematic path through the cooling and wrapping areas, a lower maintenance expense on slicing knives due to the more tender crust on the loaves and a retarded staling of the bread because of the retained moisture in the loaf at the time of wrapping.

Until recently, it appeared that a bakeshop should have a production rate of 1,500 lb. of bread per hour to afford one of these installations. Now such an installation is practical for shops producing 1,000 lb. per hour. Several installations have been made recently in plants of two peel-oven capacity. The largest installation in use at the present time is a 55-rack tunnel system cooling 8,000 lb. of bread per hour. The tunnel system was installed in this plant because the overhead-type coolers could not very well be installed for handling the output from the three 70-ft. traveling ovens.

In capacities above 5,000 lb. per hour, factors such as floor space, ceiling height, location of ovens and wrapping equipment have to be checked quite carefully before a decision is made between the conveyor and tunnel-type coolers.

Results of a survey made among users of air-conditioned cooling systems clearly indicate that cooling of bread in conditioned air has for more than a year passed the experimental stage. It is now regarded as an established and a money-saving unit process in the baking industry.

Fig. 5—The White Baking Co., St. Louis, Mo., operates its wrapping machines in an air-conditioned area adjacent to the exit end of a 2,000-lb.-per-hour bread-cooling installation.



Thermostat Prevents Costly Breakdowns In Motors

By H. C. BRUNNER
General Engineer
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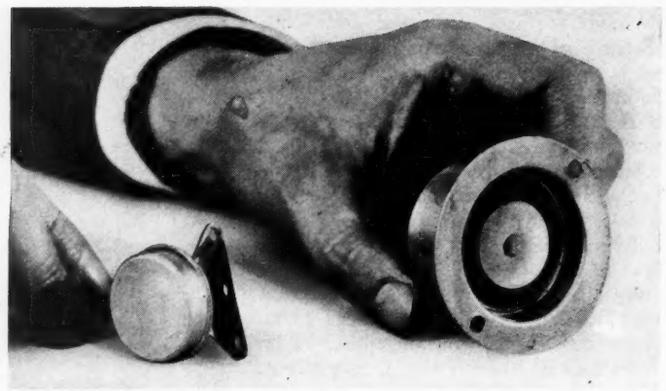


These small thermostats protect motors against burnouts. That at left is mounted in motor coils; other, on iron.

WHEN the motor driving a dough mixer burns out on that all-important production day, Friday, the bakery plant operator is up against a most expensive and harassing experience. And such an untimely breakdown is equally disastrous in many other food plants. For that matter, a burned-out motor is an expensive piece of machinery any day in the week in any plant.

Fortunately, however, the costly and unpleasant production delays that occur when the motor on a food-processing machine burns out can be prevented by a newly developed thermostatic cutout. The secret of the sure-fire protection of this new device lies in the fact that it is actuated by the temperature of the motor itself. It is bolted directly to the active iron on open squirrel-cage motors and is placed on the winding in d.c. motors. Thus, it receives heat directly from that part of the motor in which the heat is generated.

The conventional thermal overload relay, located inside the control cabinet, cannot accurately respond to the heating of the motor. There are three reasons. With the dough mixer, ice cream freezer or other batch machine, the relay heaters generally cool when the machine is stopped between batches. The motor, however, does not cool appreciably in this short interim. As a result, the rise in motor temperature is accumulative with a rapid succession of batches, while the rise in the relay temperature is not accumulative to the same degree. In the second place, dust in the food plant, such as the flour dust in a dough room, accumulates on the motor windings and decreases the cooling effect of motor ventilation—unless the dust is blown out periodically. The third reason for the difference between motor and relay temperature lies in the fact that the motors are often located under platforms, such as the mixing platforms in dough rooms, which restrict ventilation and tend to preclude frequent inspection and cleaning of the windings.

Aside from the inability of the conventional thermal overload relay to respond accurately to motor temperatures, operating conditions in many food plants make that type of protection device inadequate. Many food-processing machines, such as the dough mixer and ice cream freezer, operate on the batch principle. And the load on the driving motor frequently varies over quite a wide range during the preparation of a single batch. With the dough mixer, the motor must be designed to operate for a complete batch on either of two running speeds. And it is usually "inched" a number of times at the end of each run. Therefore, it is necessary to use one of the conventional thermal overload relays for each of the two operating speeds. Not only that, but the tripping point of each of these relays must be set at a higher value than if the load were a continuous and steady one. The setting on the dough mixer relays must be stepped up quite appreciably, because the baker occasionally wishes to make a batch of particularly stiff or dry dough. The result is that the conventional overload relay provides for only stalled-motor protection.

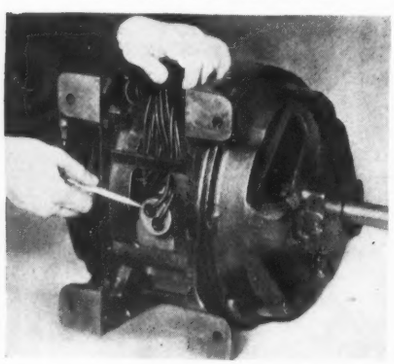
The new thermostat, being actuated directly by the heat of the motor, obviates these shortcomings. It allows the motor to do its maximum amount of work and at the same time protects it against the accumulative effect of frequently repeated overloads, "inching" and dust accumulation. And, if desired, it can be made to give a warning that the motor is becoming too hot instead of stopping the machine in the middle of a batch. This removes the temptation to "fix" the protective device which exists with the conventional thermal overload relay and which may readily result in a burned-out motor on that all-important Friday.

In the bakery and other plants where dusty conditions prevail, the overheating of motors frequently is caused by pushing the machine slightly over rated capacity at a time when dust is accumulated on the windings. Under such a condition the thermostat will warn the operator before any serious damage is done. Then he can clean the windings and maintain his operating schedule.

The thermostat is extremely simple. Its actuating element is nothing more than a bimetallic disk that flexes from concave to convex as the temperature reaches the danger point, flexing back to the original position as the motor cools. The movement of the disk opens and closes electrical contacts, stopping the motor before it burns out and allowing it to start after it has cooled.

Among the food plant machines that may be protected by the new thermostat against shutdowns due to motor burnouts are dough mixers, ice cream freezers, cream separators, butter churns, bottle washers, sugar centrifugals, pumps, corn huskers, pea graders, fat and meat cutters, dehairing machines, bone grinders, beer pasteurizers, mash tubs, wet grain dryers, conveyors and grain and flour-mill machinery.

On open squirrel-cage motors, thermostat is bolted to active iron.



On d.c. motors, thermostat is placed on winding.

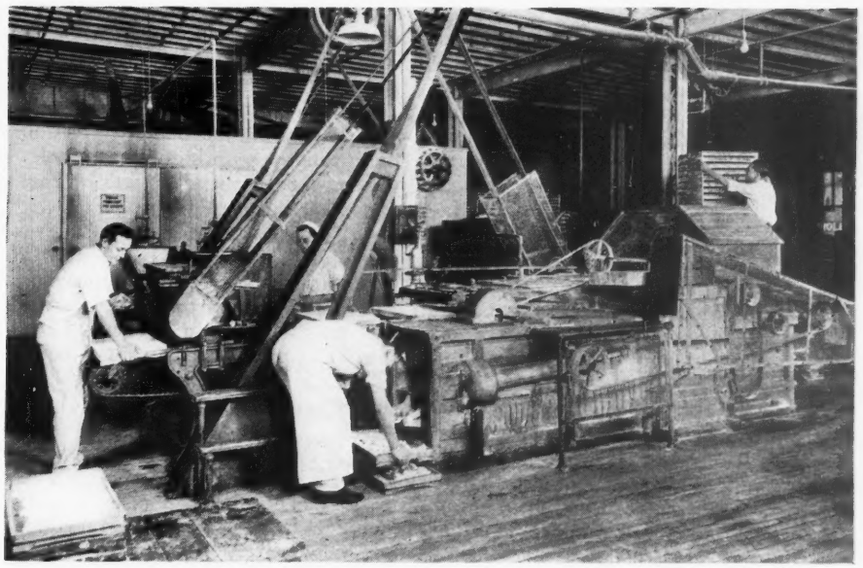


Fig. 1—The candy mass to be molded and dried is deposited hot into starch-filled "boards" imprinted to give the finished product the desired size and shape. The starch is removed from the finished confections by screening and brushing

Dehydration by Absorption

Characterizes "Cast" Confectionery Manufacture

By OTTO H. WINDT
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DEHYDRATION in the food industries is generally accomplished by evaporation in open air, heating and drying in open containers, and heating under reduced pressure. But in the manufacture of confectionery these direct methods of moisture removal serve, in certain instances, only to prepare the candy mass for another widely used but less direct method of reducing its moisture content.

In this process cornstarch is used as an intermediary agent to absorb the excess moisture from the hot mass and to mold it into the desired shapes and sizes as it cools and undergoes changes incidental to crystallization and gel formation. Such procedure permits the handling of various candies with a higher moisture content than would be possible by cooling-table or tray methods. It also makes possible volume production at low-unit cost by eliminating the time-consuming and troublesome operations of shaping and cutting as separate operations, as well as makes possible a variety of shapes and designs not otherwise practicable.

The actual mechanism of starch dehydration of "cast" confections is relatively simple. When the molding starch possesses the required properties of low moisture content and freedom from foreign materials, it absorbs moisture from all sides of the confection in the starch mold with a slight rise in temperature due to heat of hydration. The absorbed moisture is retained largely by the starch when no heated drying rooms are required. In the case of those confections which require additional drying in heated chambers, this moisture is transferred to the heated air and a continuous drying cycle is set in motion. The starch in that case acts as an intermediary in the moisture removal. This dehydrating process is permitted to progress until the candies attain the desired moisture percentage.

The rate of drying depends on various factors. Two of the most important of these factors are the moisture-absorbing capacity of the starch and the conditions of temperature and relative humidity prevailing in the drying or setting rooms. It should be readily understood that the time of drying is governed also by the moisture content of the confections when deposited and by the composition of the confections, especially as relates to their hygroscopic ingredients. The degree of hygroscopicity of the confection determines the rate and the extent of drying possible under any given set of conditions. The variety of confections made by the starch process is such that no attempt will be made to formulate definite conditions for specific dehydrations. Each manufacturer must determine carefully for himself the optimum conditions of temperature, relative humidity, air circulation and similar factors which will give his confections the proper moisture content.

In the case of some types of starch "jellies" or "gum" drops, gum arabic candies, and marshmallows of the "grained" or crystallized type, these conditions can be obtained only through the use of drying chambers maintained at the proper temperature and relative humidity. The production of quality confections depends on the determination and maintenance of the optimum drying conditions, which vary with the nature of the product to be dehydrated.

Confections undergoing additional de-

hydration by being placed in a drying chamber should not be subjected to excessively high temperatures. If the drying process is "forced," the candies may acquire a tough outer skin, which is in effect similar to "casehardening" and will prevent or greatly retard proper drying. In extreme cases, the formation of water vapor on the interior of the candies causes them to "blow up" or blister. Caramelization at excessively high temperatures also occurs, especially when the confections contain appreciable quantities of invert sugar; the levulose content of the invert sugar decomposes readily. As a general rule, the drying-room temperature for soft starch jellies which are to be sugar-coated should not exceed 140 deg. F. As a point of interest, it is well to know that the better class of starch jellies are now being produced without additional drying in heated rooms.

Although the mechanics of starch drying of candies is simple, efficient, controlled drying of deposited confections through the application of starch is an operation requiring close supervision. In the first place, the starch must meet the following qualifications if proper results are to be obtained:

1. It must not contain over 7.0 per cent moisture. The moisture content may be maintained anywhere between 4 and 7 per cent, depending on the drying operation for which the starch is to be utilized and on the limits imposed by the available starch drying conditions. Starch containing 4.5 to 5.0 per cent moisture is ideal for general use. And, for best results, the starch should not be expected to absorb more than about 2.5 per cent of its weight in moisture.

2. The starch must be *clean*. It should be free from such materials as candy "tailings" or "tags" (resulting from the slight "stringing" of some candies during depositing), wood splinters, brush bristles, and similar "foreign" substances.

3. The starch should be periodically sterilized or thoroughly dried to prevent growth of molds, yeasts and bacteria which are highly undesirable. It is well to point out that if the moisture content remains above approximately 12 per cent for any considerable length of time, the following conditions may arise: (*a*) accelerated deterioration of the starch with subsequent impairment of the molding and drying qualities; (*b*) the possibility of fermentation of such candies as chocolate-coated "cream" centers and marshmallows, due to infection of these candies with highly sugar-tolerant yeasts; and (*c*) mold growth on candies under certain conditions.

4. The increasing reducing-sugar content should be checked and kept at a minimum through starch replacements. This factor affects the drying power as well as the molding properties of the starch. Jordan* states that 5 per cent is the practical maximum reducing-sugar content permissible in molding starch.

5. Maintenance of the proper starch temperature at the time the liquid candy mass is deposited also is an important factor that should be under control. The optimum starch temperatures for his various confections is one of the specifications which should be determined carefully by each candy manufacturer.

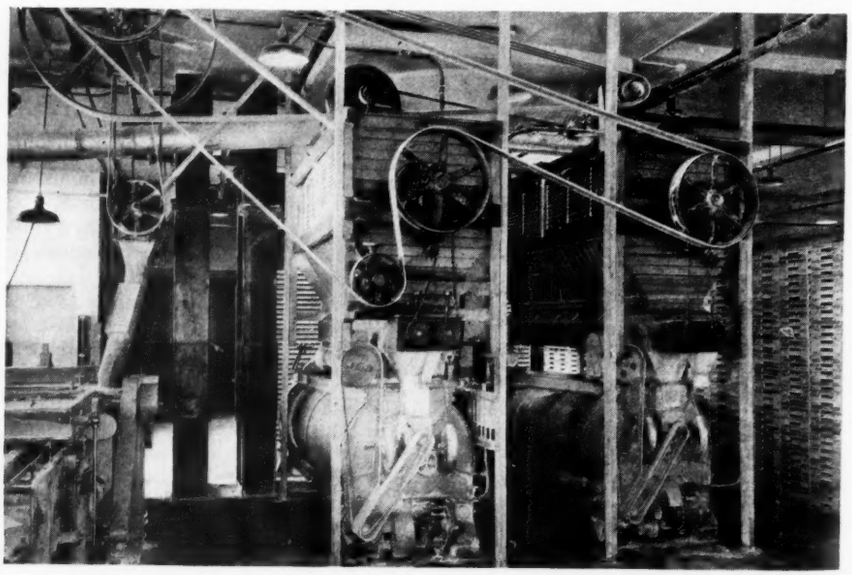
Moisture content, cleanliness and optimum temperature specifications of the starch are obtained and maintained largely through the "conditioning" treatments given it at the various steps in its use and recovery. But before we proceed further with a discussion of the "conditioning" operations it is best to digress sufficiently to acquaint ourselves with the type of starch used and some of the important steps in its use.

Because this starch must fill the dual rôle of being a molding as well as a dehydrating agent, the manufacturers of molding starch have produced a regular, or "standard," type and a "special" type. The regular, or "standard," starch is a finely powdered, unmodified cornstarch meeting the specifications of the Federal Food and Drug Administration for food purposes. When this starch is shipped to the confectioner it contains approximately 7.5 per cent moisture. It is used only for mixing with or replacing part of the molding starch already in use. It cannot be successfully used alone for satisfactory molding purposes because of its "lightness" and lack of "binding" properties. The "special molding starch" is identical with the regular powdered cornstarch in every particular except that a very small quantity of refined mineral oil is added to the starch to impart the proper molding characteristics. This starch is recommended when complete replacement of the starch in use is necessary. Mixing it with used molding starch is not advisable, as the resulting mixture may be too "heavy."

In its simplest form starch molding and dehydrating equipment consists in part of a wooden tray compactly filled with molding starch into which is imprinted designs to serve as molds for shaping the confections. These imprinted designs are formed by forcing into the compact starch patterns or dies of plaster of paris, usually mounted on a wooden strip so as to give uniform impressions. Instead of making a single impression or a single row of impressions at a time, these mounted patterns have been developed into the "mold-board" (the analogue of the "match-plate" in the foundry) mounted and shaped so as to print a starch-filled tray in one operation. Hand-operated units—"printing frames"—have been replaced by automatic machine-operated molding units to the point that compact layers of starch either in trays or on a moving belt are imprinted in a systematic and continuous manner to synchronize with the operations of the automatic depositor.

*FOOD INDUSTRIES, Vol. I, p. 610; October, 1929.

Fig. 2—Starch gives best results when it is dried, screened and adjusted to proper temperature before being returned to mogul for refilling into starch boards.



These high-capacity automatic depositors have taken the place of the metal, spoutless funnels of suitable capacity and desired-sized openings by which the old-time candy maker filled the starch molds with the liquid candy mass. The openings of these funnels were fitted with wooden, rodlike plugs by which the operator controlled the flow of his candy mass from the funnel. Ofttimes these funnels were constructed so that four or more molds could be filled at a time and were known as "runners."

Along with the development of the machine-operated printing frame and depositor was developed the "starch-buck," which mechanically replaced the hand method of "brushing" or separating the candies from the starch after the desired setting and dehydrating results had been obtained. Further developments combined the printing, depositing and brushing units into one fully automatic and synchronized production unit known as the "mogul," originally made of wood, but now built of steel and used in connection with continuous starch drying, cooling and sieving, or reeling, equipment. Development of these large-capacity units was made possible partly because cornstarch admirably performs the dehydrating function, is available in abundance, has a low initial and replacement cost, and can be handled readily by the use of worm, bucket, or pneumatic-type conveyors, sieves, and similar machines suitable for mass production.

Regardless of whether used in small or large quantities, molding starch must be dried to the optimum moisture content before it can be used successfully for confectionery molding and dehydration. Otherwise, the starch not only has its drying power greatly impaired, but when it contains too much moisture it cannot be readily brushed from the candy surfaces with which it comes in contact. In extreme cases a starch "crust," which is very objectionable, forms on the confections. This drying may be done in heated chambers, or "drying rooms," or in automatic or continuous starch dryers which are coupled directly to the mogul.

Drying-room dehydration of starch prior to its use is a subject that will bear detailed treatment. Also the remarks made in that connection apply equally well to that phase of confectionery dehydration, referred to earlier, in which the deposited candies are placed in drying chambers for controlled drying until the proper moisture content is attained. The factors that must be given consideration and subjected to close control are: (*a*) 24-hour operation whenever possible; (*b*) correct uniform temperature coupled with good circulation; (*c*) sufficiently low relative humidity, and (*d*) proper drying time. Generally speaking, the temperature of drying rooms used only for starch drying can be elevated to 150-160 deg. F. to give a considerable decrease in drying time. The rapid rate at which the vapor pressure of water increases with rise in temperature is well known, and this knowledge should be applied to drying-room operation. By so doing, standard drying conditions can be readily determined by any manufacturer. And when once determined these conditions can be adhered to.

It must be borne in mind that in the confectionery industry drying rooms are utilized for the two purposes of proper drying of molding starch prior to candy deposition and of providing additional dehydrating facilities for confections that require greater drying than can be obtained by the "no-drying-room" process.

In connection with drying-room installations it is a pertinent fact that, even during the last few decades of accelerated scientific enlightenment, the average manufacturing confectioner has been singularly immune to the application of practical scientific principles. This fact is illustrated in the construction of drying chambers without any but the very slightest consideration for basic facts. Drying rooms, on the average, require more floor area than any other operation in the plant. Yet this allotment of valuable space has been made, in a great number of the older plants, without any but the most superficial study of actual requirements. Fortunately, conditions change, and confectioners who years ago were compelled to develop their own drying systems now have available standardized equipment together with expert engineering counsel on efficient air conditioning.

Briefly, some of the principal faults extant in present-day drying-room practice are:

In the first place, proper construction of drying chambers with regard to *efficient insulation* is an important factor often neglected.

In the second place, *it is an all too common practice to operate drying rooms for only a few hours daily.* The operating or heating time usually coincides with the regular heat and power requirements of the factory. This method is, obviously, not a satisfactory procedure. Usually the only excuses given for part-time operation are that the necessary steam for heating and electric current for fan or blower operation are not available after regular working hours. Both of these reasons leave unanswered the questions:

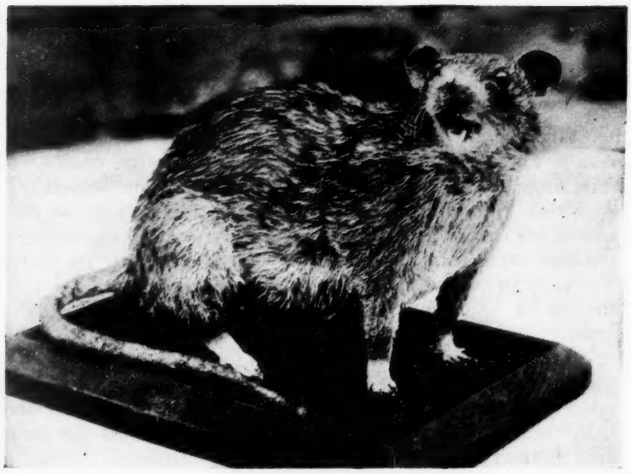
1. Why cannot a small auxiliary boiler (preferably an automatically controlled oil burner) be installed for night operation?

2. Why cannot the small amount of required current be purchased from the local power company?

In the July issue of Food Industries, *Mr. Windt will conclude his discussion of drying-room operation and will introduce us to some of the starch-conditioning methods.—Editor.*

Fig. 3—In its Brooklyn plant, Wallace & Co. saves floor space and simplifies the handling of the starch by suspending the conditioning unit over the starch-buck.

Grey rat



Norway rat (brown)

YOUR RAT — AND MINE
Their Eradication

By HARRY STINER

Flushing, N. Y.

Rat control represents a most harassing and distasteful task. But it must be done, for rats, like flies, thrive unless a systematic method of eradication is employed. The method to be used depends largely upon conditions in the plant. The advantages of the different methods and different poisons for eradicating rodents are pointed out in this article.

ASSOCIATING rats with human food has an unwholesome and revolting aspect. But it is a relation demanding thoughtful consideration, for rodents are a thorn in the side of almost every food manufacturer and dealer in the world.

The job of catching rats is often looked upon with contempt, and even the animals themselves are sometimes ignored. But there is at least one rat to every human being in the United States, and each one destroys or eats about a pound of food a day. The damage done by these 120,000,000 rats, together with the killing of their 3,000,000,000 annual offspring, costs about $219,000,000 every year. Besides, the rat is one of the dirtiest of pests and a natural source of the bubonic plague. In light of these facts, rat eradication becomes an economic necessity, a safeguard to health and, in fact, an honorable activity.

Rats have been with us since ancient times, and have steadily increased in defiance of man's superior intelligence and eternal resistance. And unless still more effort is made to stay their progress, continued increase is inevitable. The rat is not sensitive to man's dislike. In fact, he literally thrives on contempt, for it often permits him to go his way ignored and unmolested. Passive resistance is not effective against him. It's a case of taking action or paying the piper.

The market abounds with rat traps. Hardly a month passes but from one to a dozen find their first, and often their last, resting places in the Patent Office archives. In some places, traps are preferable, but care must always be taken to eliminate all foreign odors on them, such as from the hands, tobacco or grease. They must also be made as inconspicuous as possible, and even then they will often fail. But in loosely built structures or tightly packed warehouses where the rats can retreat and die, they have an advantage over poison. Their victims can be removed.

Poisons, however, have it over traps in both popularity and efficacy. There are literally hundreds of different poisons. These include the bacterial disease-producing viruses, which, while certainly potent in some instances, often produce effects not altogether desirable around a food factory. Therefore they will not be considered further.

As with the traps, many of the poisons are effective in certain places, but no one type can ever be expected to work equally well under all circumstances. For with the rat's remarkable ability to adapt himself to his environment, with his intuitive distrust of man, and with the preponderance of foods which are palatable to him, he is not always easy to poison. And frequently, several different methods must be employed to rid a place of the rodents.

Until fairly recently, such highly toxic poisons as strychnine and arsenic were used extensively. The idea was to use something certain—to take no chances on a comeback. But such materials were not altogether satisfactory. They did the work, to be sure. But they were equally effective on other animals, as well as on the operator, if taken out of turn. So they have been replaced largely by slower

acting and more easily counteracted poisons.

Red squill, a bulb which grows along the shores of the Mediterranean, is very popular at present. When mixed, as a powder or liquid, with any edible material, it usually kills the rat inside of 24 hours, provided, of course, that the rat takes enough. The virtue of red squill lies in that it requires a relatively large quantity to kill anything, and its taste is so bitter that other animals refuse to eat enough to hurt them. When no other foods are available, rats eat red-squill baits readily.

Perhaps one of the most successful all-around bait poisons used in rat control, and certainly a popular one, is commercial barium carbonate powder. It is less toxic than strychnine and arsenic, but more deadly than red squill. As barium carbonate is insoluble in water, it is always mixed with some form of moist food. It is tasteless in its natural state and is readily taken by rodents. However, the acid produced when the bait sours usually reacts with the barium carbonate to make a bitter, unpalatable material. Therefore it must be replaced each day.

When rodents are being combated in the open, where food is food and no one particular type obtains, a poisoned bait unquestionably ranks at the top of the list. Likewise in inclosures such as factories or warehouses, where desirable foods are either absent or thoroughly protected, poisoned baits stand in high favor. But in factories whose chief function is producing foods, in warehouses where foods are stored in containers which cannot be made rat-proof economically or in stores with hundreds of delicately wrapped packages, the rat not only gets plenty to eat but soon comes to know the characteristic odor and flavor of the materials he encounters. And his highly developed instinct stamps as dangerous any foreign taste or odor.

Of course, special campaigns may be put over in almost any inclosure by completely isolating all food materials for several days, thus starving the rat to a point where he will eat any poison. This procedure, however, always is costly in time lost. And its effectiveness is curtailed by the fact that almost any rat's nest contains a considerable quantity of choice materials which can be eaten during "famine." This not only reduces his tendency to take the poisoned baits but leaves a breeding nucleus of animals to reinfest the place. Periodic campaigns to control rats in food factories have another objection: In the interim between campaigns, little precaution is taken to keep foods away from the rats, and their ravages, as well as their numbers, increase accordingly.

Rats like any other animal, must have water as well as food. Of course, water is used extensively in most food factories, but, for sanitary reasons, most manufacturers drain all surplus water away and empty all receptacles when the day is done. In this way water becomes a scarce article during the night when the rats are "running" and any available source usually is well patronized. Consequently, the poisoning of water supplies placed at convenient intervals throughout the plant is a logical method of rat control in food factories.

There are several liquid poisons, but they are still more or less in the experimental stage. Certain soluble forms of strychnine and arsenic have been employed. But as in baits, their high toxic properties are objectionable. Red squill and barium carbonate powders, being insoluble, settle to the bottom of the receptacle and leave a non-poisonous liquid for the rats. One of the most promising materials so far tried is commercial barium chloride. It has the relatively mild toxic properties of barium carbonate and no outstanding foreign odor nor flavor. This material is soluble in water, has a slight salty taste, but it in no way changes the natural appearance of the liquid. The salty taste may be largely overcome by adding sugar, and, if desired, a few drops of anise oil. Or some natural odor of the locality may be added as a disguise.

Poisons of the liquid type have the advantage of being effective as long as they last, whereas most baits become either dry or sour soon after distribution. They also are inexpensive and easily made, and if the places where they are used are kept in a sanitary condition, they usually serve to satisfy the rat's craving for a thirst quencher.

Much has been said concerning the rather undesirable feature of a poisoned rat's crawling into some inaccessible hole to die. Most poisons are advertised as being specifically adverse to this tendency. But the fact remains that when a rat begins to experience the poignant sensation of poisoning, he is going to go places. If he is out in the open or up a pole when locomotion comes to an end—fine. But if he is in his hole, there is most likely to develop a distinctly unpleasant odor in that vicinity. The logical thing to do, it appears, is to close all small openings in the building before putting out poison for rats.

This brings in another method of rat control. The complete rat-proofing of any structure often proves more effective than a full complement of dogs, cats, traps and poisons. It is assumed, however, that every modern food manufacturer is doing this to the utmost of his ability, if for no other reason than to keep his building from being gnawed to pieces.

Whatever the method of rat eradication employed, it must be administered in a systematic manner. Rats are like flies—if you don't "swat 'em" regularly they'll soon infest the place.

Black rat

Swarm of rats wreaking havoc with coffee bags

Illustrations used in this article are from the Bureau of Public Health Service, Treasury Department.

Whether It's Tap or Lager

It Must Start With

By **PAUL JOHN KOLACHOV**
Lincoln, Neb.

BEER can be classified by its color, into light and dark; by its taste, into sweet and bitter; by the quantity of alcohol, into strong and mild; and by the quantity of extracts, into heavy and light; by the period of storage, into tap and lager beer; by fermentation, into "bottom" or "top" fermentation; by the container, into bottled and barreled. Beer must have a rapid turnover, for it deteriorates after a certain period. Old beer becomes bitter and cloudy and loses its foam. Beer of proper age has a white, thick foam, capable of maintaining itself an appreciable time.

Beer extract is composed of dextrins, a small quantity of maltose (½ per cent), and dextrose (2-4 per cent), nitrogenous substances (albumin and amines, 0.4 per cent), glycerine (0.2 per cent), lactic acid, succinic acid, and acetic acids, lecithin or its derivatives, cholin, and ash (0.2-0.3 per cent), particularly potassium phosphate. One of the most important ingredients is carbon dioxide, which must be at least 0.3 to 0.4 per cent or more to give the beverage a refreshing taste. One of the most essential properties of beer is its ability to retain its CO_2 while being poured and to emanate it gradually. This characteristic is accomplished with the aid of cholin.

There are very few vitamins in beer, for they are retained in the yeast wastes—especially vitamin B. Following is the chemical composition of several varieties of beer:

	Berlin Weissbier	Pilsen	English Pale Ale	Vienna Marzenbier	Munich Hofbrau	Porter	Milwaukee Lager
Extracts	3.19	4.63	5.04	6.21	6.82	8.68	4.18
Alcohol	3.07	3.65	5.20	4.35	3.86	6.72	4.28
Saccharized starches	9.23	11.71	14.96	14.53	14.21	21.06	....
Albumin	0.253	0.381	0.554	0.566	0.589	0.775	....
Sugar	2.43	3.96	4.03	5.34	5.91	7.31	....
Acids	0.356	0.106	0.107	0.084	0.101	0.214	0.057
Ash	0.143	0.185	0.3450	0.223	0.224	0.382	0.196

Maladies and Defects in Beer—Defects and maladies in beer effect mainly a change in taste and appearance. This may be a result of either an error in manufacture or a subsequent development of microorganisms in the beverage. Scantily foaming beer is not only an external defect but its scantiness may actually depend upon the quality of the beer, which is unable to retain CO_2. Beer begins to become cloudy with time. Cloudiness is due either to segregation of the unsaccharized starches, or to untimely segregation of coagulable albumin, or to segregation of hop resin, or is due to the presence of *Pediococcus sarcinefomis* (Migula), or to other bacteria and wild yeasts. If the cloudiness is due to any of the first three factors, filtration through asbestos or cellulose filters will remedy the condition. However, if the condition is due to presence of *Pediococcus sarcinefomis* or wild yeasts, the beer changes its aroma and taste, and is not fit for use.

Cloudiness is caused also by *Pediococcus viscosus*, and a vinegary taste is caused by acetic bacteria. The wild yeast, *Saccharomyces apiculatus*, gives the beer a fruity taste. *Saccharomyces validus*, *Saccharomyces turbidans* and lactic bacteria make the beer cloudy. *Saccharomyces pastorianus* makes the beer bitter, and gives it a foul odor and cloudiness. Sometimes an unpleasant taste and cloudiness are caused by *Torula*.

Cloudiness appears also after long contact with pipe metals, such as iron or pewter, which are sometimes used in European practice. Though the beer itself resists this condition by forming the so-called "beer stone," which ultimately prevents the liquid from coming into direct contact with the metals, nevertheless long contact with iron will invariably produce an inky taste.

Barley—Several varieties of barley are used for brewing beer: *Hordeum distichum nutan*, the head of which bends down considerably while ripening; *Hordeum distichum erectum*, the head of which remains up. Among the downcast barleys the following are particularly well known: Chevalier (England), Hanna (Moravia), Annat (Scotland). Fig. 2 shows *Hordeum distichum erectum*. Among the best known erect barleys are Imperial and Swan Neck. To be well adapted for brewing, barley should have high extract content, should be easily workable, and should make a good bodied beer. The quantity and character of albumin present and the ripeness and liveliness also are important. The following is a table of the required chemical composition of suitable barley as prepared by Lindner:

	Per Cent		Per Cent
Moisture	14.5	Fat	2.93
Starch	63.15	Ash	2.93
Gluten	5.85	Other non-nitrogenous matter	14.03
Albumin (dry barley)	11.11		

The appraisal of barley for brewing purposes is done in the following manner: (1) general inspection; (2) mechanical analysis; (3) determination of sprouting ability; (4) chemical analysis.

The following factors are important in the general inspection of barley:

1. General Inspection—(*a*) The *color* of the barley must be light yellow or yellow. A dark colored barley, particularly at the tips, signifies that the barley must have been wet during harvest. A greenish color indicates that it is not quite ripe, and dark grayish tips indicate damage due to microorganisms. (*b*) The *odor* must be fresh, resembling the odor of straw; it must not be musty. (*c*) Barley must be free of foreign matter, such as weeds or particles of grain and damaged grains. Care must be taken, particularly in graded barley, that the grain is free from admixtures of other grades. Barley which is intended for brewing must be cleaned before shipment. (*d*) The grains should be uniform in size and shape, and preference always should be given to grains that are plump, large and heavy. (*e*) Defects should be avoided. Barley must be free of contamination from either parasites or sprouted grains.

2. Mechanical Analysis—(*a*) The absolute weight is expressed by the weight of 1,000 grains of barley, which varies; for graded barley, 30-40 grams of dry substance. (*b*) *Nature of grains*—Weight of grain in pounds in one hectoliter (2.837 bu.): heavy grains, 172.5-180 lb.; medium heavy, 165-170 lb.; light, 155-162.5 lb. (*c*) *Sorting* of barley has for its purpose to check the uniformity of grain and the quantity of foreign matter. Normal barley should have at least 80 per cent of uniform grains and the quantity of foreign matter should not exceed 5 per cent. (*d*) *Cutting test*—For brewing beer, the mealy type of barley is preferred because it absorbs water more uniformly and, by sprouting, produces malt of better quality. The mealiness of barley is determined by cutting the grains, using special apparatus (Farinatom) or by examining it in optical apparatus called a Diaphanoscope. Barley of good quality should contain at least 80 per cent of mealy grains.

3. Energy and ability to sprout are the most important qualities of barley, because they effect a uniform process of change of matter throughout the period of sprouting. The sprouting energy is characterized by the uniformity of growth in a certain period of time (usually three days), while

Good Water, Hops and Malt

Fig. 2.—Hordeum distichum erectum (barley)

the ability to sprout means the per cent of grains sprouted after a period of five days. A healthy, ripe barley must have a sprouting energy of at least 90 per cent, and sprouting ability of 96 per cent.

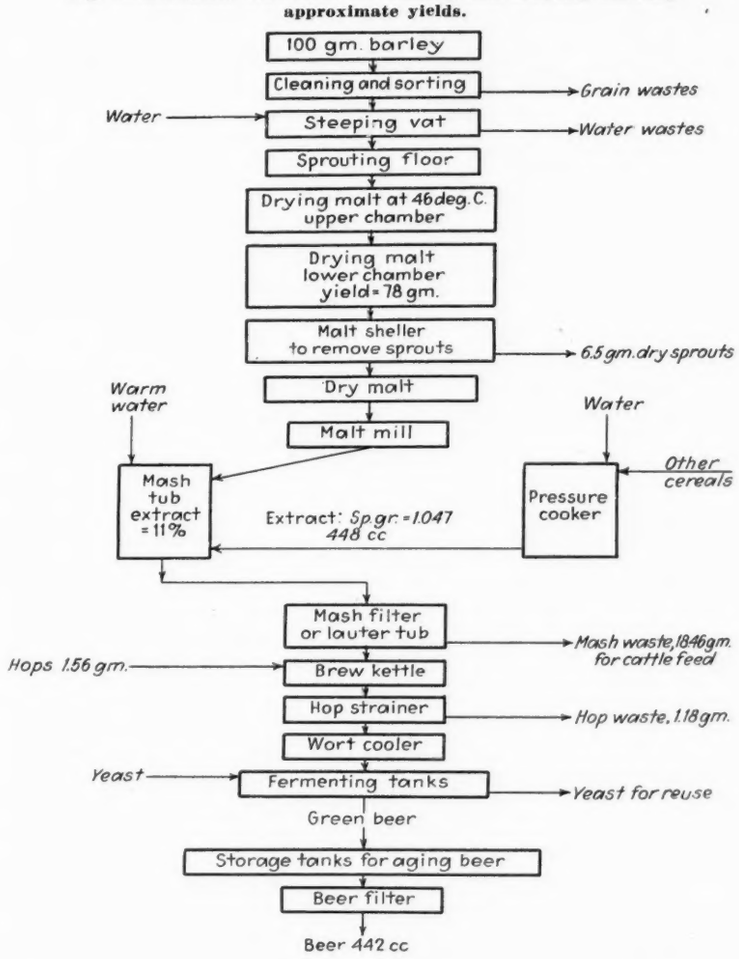
4. *Chemical analysis* is limited to a determination of water content, and the quantity of albumin and extracts. When a more elaborate study of barley is desired, the content of cellulose, ash, phosphoric acid, fat, pentosans, weight of bran, and general acidity are determined. (*a*) *Humidity*—The content of moisture not only increases the weight of the grains, and consequently increases its cost, but it also invites difficulties encountered in storage, tending to damage and making it necessary to dry the barley. Barley should have 15-15½ per cent of moisture. (*b*) The content of albumin is determined by the method of Kjeldahl. According to Osborne, when barley has a general protein content of 10.75 per cent, it is distributed in the following proportions: *albumin*, 0.30 per cent; *globulins* (edestin), 1.95 per cent; *prolamin* (hordein), 4 per cent; insoluble albumins, 4.5 per cent. For brewing purposes, the content of albumins preferably should not exceed 13 per cent, because an excess of albumins leads to a decrease in the quantity of starch; but the main defect of too much albumin content is that it reacts only with difficulty, tends to heat during the sprouting period, and prevents best results. (*c*) *Starch*—The starch content is the basic property for judging the quality of barley, because on this quality depends the quantity of beer per unit of raw material. The quantity of starch in such barley varies from 54 to 64 per cent. In usual practice it is preferable to determine the extract content instead of starch content, which, in addition, gives an idea of the extractivity obtained from barley malt. At times brewers use substitutes for barley, such as wheat, rice or corn, up to not more than 25 per cent. As is known, corn contains a large quantity of fat, especially in the germ. Due to the fact that fat has a destructive effect on beer foam, only corn previously freed of germs can be used, and such corn must have not more than 1.5 per cent of fat.

Water—In beer manufacturing a tremendous quantity of water is used. In one operation per day approximately four times as much water is used as the resulting mash, and when two cycles of operation are completed, seven times as much water is used. Water is used for preparing malt, for cooking the mash, washing the yeast and all containers and apparatus that come in contact with beer. To be fit for all the above purposes, the water must be free of any foreign substance that may have a detrimental effect on the processes of sprouting, saccharization and fermentation. It must satisfy the demands of ordinary drinking water. Water of 4-8 deg. of hardness is considered *soft;* 8-12 deg. is *medium hard;* 12-30 deg. is *hard;* and above 30 degrees is *very hard.* The best water for this purpose is one having a hardness not exceeding 15 deg. The term "degree of hardness" comes from Europe and means grains per gallon plus one.

For preparation of light types of beer the best water is a soft water. The presence of large quantities of bicarbonates decreases the acidity of mash, which comes mainly from the presence of acid phosphates. The determined acidity of mash has great significance for fermentative processes, for saccharization, decomposition of albumin, normal filtration, sedimentation of albumins, and color of mash. Carbonates at times aid the transfer of undesirable ingredients of hops into mash. For dark types of beers, the presence of carbonates is immaterial. According to Zeiphert, water with a carbonate content is more desirable for steeping the barley, because $CaCO_3$ extracts from the barley those substances which give a bitter and coarse flavor to the beer.

Water which contains gypsum, according to the opinion of brewers, has a retarding effect, but gives beer with a better body. Besides that, gypsum raises the acidity of mash, because gypsum transfers the secondary phosphates into primary acid phosphates. However, an excess of gypsum also is undesirable, for the beer then acquires a tendency to form gelatinous sediments and coagulated albumins during pasteurization. Moreover, the creation of a great quantity of $MgSO_4$ and K_2SO_4 has a detri-

Fig. 1—Schematic Flowsheet for malting and brewing, showing approximate yields.



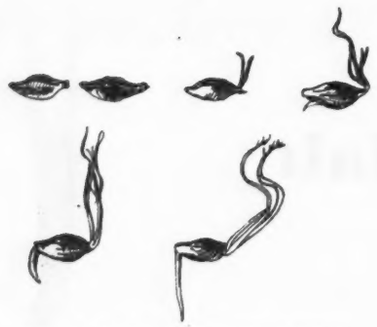


Fig. 3—Stages of Sprouting Barley.

mental effect on the taste of beer. Because of the great influence of the chemical composition of water upon the quality of beer, at the present time the use of means for reducing the hardness of water is widely applied. In typical carbonated beverages the reduction of the hardness of water is effected through boiling or by adding lime to the cold water. Sometimes artificial acidification of the mash is brought about by the use of lactic, tartaric or sulphuric acid, or by addition of lactic bacteria. In addition to the chemical composition of water, the significance of its biological status, or content, should not be underestimated.

Malt—Malt is defined as the sprouted, dried and freed-of-sprouts barley or other grain. In preparing beer malt, the purpose is not only to obtain a maximum formation of diastase with a minimum loss due to respiration but also to obtain in the grain a whole series of transformations of matter (the decomposition of albumin and bran) and to obtain a good solution of the grain, or, as the Germans say, "Auflösung." The phases of barley sprouting are shown in Fig. 3.

For dark and light beer a good malt should have the following constituents:

Matter	Light Beers Per Cent	Dark Beers Per Cent
Dry substances	94.69	98.03
Water	5.31	1.97

Extract yield according to Balling:

From air-dry malt	70.24	69.65
From dry malt	74.07	74.83
Period for dissolving	30 min.	15 min.

One hundred grams air-dried malt gives, according to Balling:

Extract	70.24	69.61
Sucrose	2.66	1.51
Maltose	34.85	39.63
Other reducing sugars	4.83	5.77
Dextrine	17.74	12.37
Albumenoids, ash, etc.	10.16	12.99
Ratio of extract to maltose	1:1.06	1:3.20

Following are additional properties of good malt: (1) Volume weight, 130-135 lb. per hectoliter. (2) Grains are full and float in water. (3) Grain is easily crushed and has a whitish color. (4) The taste of crushed grain is sweet. (5) The odor of the malt is agreeable and characteristic. (6) In color the malted grain is always somewhat different from the color of the unsprouted grain of barley.

Malt is never used immediately after drying, but is kept for a period of 6-8 weeks in dry, well-ventilated storerooms. Experience shows that stored (but not having absorbed in excess of 6-8 per cent of moisture) malt produces a beer with a higher content of extract, which is tastier and more aromatic.

Hops—By hops or hop cones, as technical or commercial terms, is meant the female unfertilized blooms of a plant, *Humulus lupulus,* from the family of ivies. The chemical composition of hops is analogous to that of other plants but, in addition, hops possess specific ingredients which play an important rôle in brewing. By this we refer to the hop oil, bitter acids, lupulin resin, tanning substances (the latter are contained in all parts of the cone). Fig. 4 shows a completely ripened cone of hops. The use of hops in brewing has

Fig. 4—Hops

a twofold significance: first, it gives the beer an agreeably bitter taste and hop aroma; second, due to its antiseptic action on microorganisms, it increases the body of the beer.

The appraisal of the quality of hops, up to now, has been effected almost entirely by organoleptic methods. However, recently attention is also being directed toward chemical analysis. Good hops, well selected and well sorted, should not contain cones either with excessively long trunks or without any scales. The size of the cones should be more or less uniform and only a small quantity of seeds in cones should be allowed. The cone and scales should be thin and the scales should cover each other quite well. The color of cones should be yellowish green. A light green coloration signifies underripeness, while a reddish maroon coloration points to badly accomplished drying or to very long storage. The odor should be sufficiently strong and characteristic.

Some of the quantitative contents of lupulin and its quality are obtained by the following analysis: The cone is broken up and the uncovered surface of the scales is pressed on paper; a fat. light yellow line indicates a sufficiently great quantity of lupulin, while a thin line indicates the contrary; and finally, a deep maroon line results from old, storaged hops.

Composition of Brewery Yeast

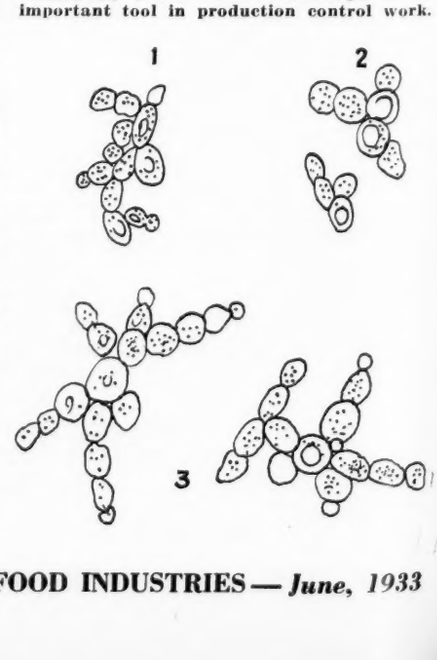
	Per Cent
Water	76.41
Soluble Nitrogenous bodies	1.12
Insoluble Nitrogenous bodies	11.35
Minerals	1.65
Resinous material	0.08
Fat, cellulose, etc.	9.39

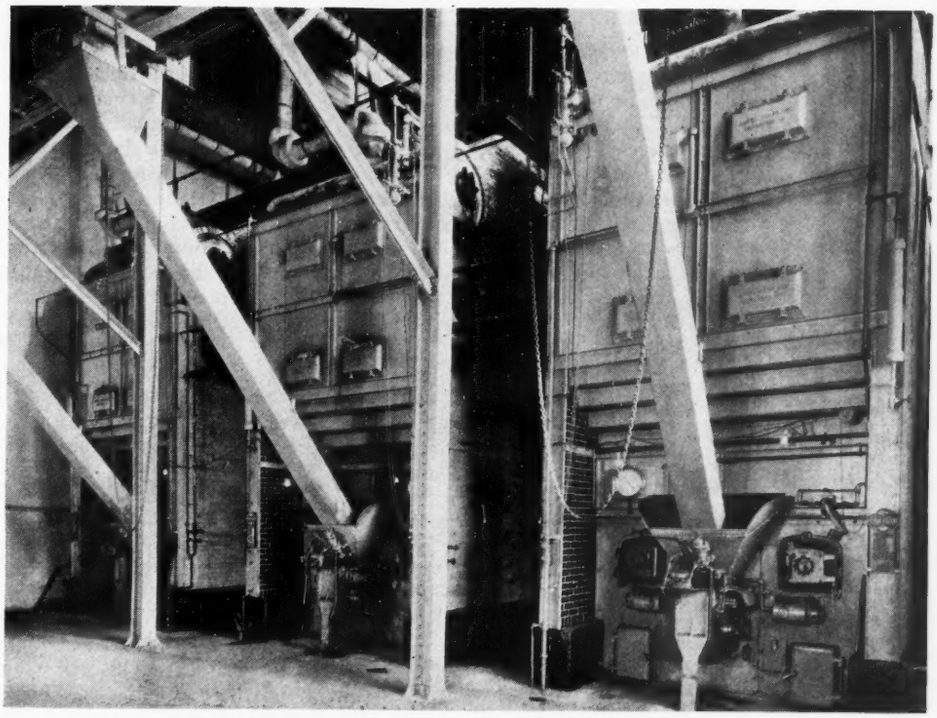
Quantitative Analysis—Seed content should not exceed 1.25 per cent by weight. Moisture should be between 8 and 14 per cent. Ash content should not be over 10 per cent in dry hop matter.

Yeast—At the present time pure culture yeast is more generally used in beer brewing; this aids in obtaining beer of uniform properties and forestalls deterioration. Pure cultures of a desirable type of yeast, prepared by laboratory methods, are added to the mash, and subsequently a part of the amount of yeast multiplied during fermentation is taken from the mash tub and reused again and again until a microscopic analysis shows contamination with other types of *Saccharomyces* or other microorganisms. Then the yeast is no longer used and a new supply of culture is obtained from the laboratory. The various beer yeasts are distinguished by the rate of spore formation, rate of fermentation, rate of clearing the beer, and the body of the beer produced.

In beer brewing the following types of yeast of the group *Saccharomyces cerevisae* are most generally used: (1) Saaz of top fermentation. (2) Saaz of bottom fermentation. (3) Frohburg top and bottom. (4) Carlsburg, bottom No. 1 and 2 (Hansen), of which yeast No. 1 gives a good bodied, but not easily clearing beer; and No. 2, which, while giving beer of good quality, better than No. 1, is able to remain free from contamination (see Fig. 5).

Fig. 5—Beer yeasts of differing characteristics (1) Saaz yeast. (2 and 3) Top fermenting years. The microscope is an important tool in production control work.





Choosing Fuels on the Basis Of Plant Performance

By GUY MANKIN

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By far the biggest factor in steam and power costs is represented by fuel. To keep these costs within satisfactory limits, therefore, that fuel must be selected which will give the greatest economy in the particular boiler installation under consideration. And choosing the best fuel for the purpose requires a knowledge of fuel characteristics and a familiarity with methods of determining the value of a fuel in a particular plant. The heat value per pound, or even per dollar of costs, is by no means the entire story.

FUEL represents about three-quarters of the total cost of producing steam for processing operations and power in the industrial plant. Therefore, intelligent choice of fuel offers a great opportunity for saving in this cost.

The first characteristic to consider in any coal is the ash-fusion temperature, or clinkerability. Practically every plant has had serious clinker trouble at one time or another. Combustible losses increase rapidly with clinkering. and if serious, the steaming capacity is drastically reduced. The best practical test of fusibility with any given coal in any particular furnace is to burn it at the maximum rate that will be required and under the conditions of excess air which are practicable.

It is best not to draw the requirements as to ash-fusion temperature too fine, nor to set arbitrarily the limit too high. While it is necessary to choose a coal with a high enough fusion point to avoid serious clinker trouble, the setting of unnecessarily high limits radically restricts the field of fuel choice.

Analysis of coal production in the Eastern bituminous field in relation to the ash-fusion point indicates that only 15 per cent of the total coals mined in this field have an ash-fusion temperature as high as 2,600 deg. F., while 35 per cent fuses at 2,500 deg. F. and almost 80 per cent at 2,300 deg. F. or higher. In other words, only 20 per cent of the total coal mined in this field, in the year studied, had a fusion temperature below 2,300 deg. F.

Thus, if your plant were drawing its coal supply from this field, to set the ash-fusion limit arbitrarily at 2,600 deg. F. when no serious clinker difficulty would be experienced with coal at 2,500 deg. F., if properly fired, would mean restriction of fuel choice to the relatively narrow range of higher-priced coals. Dropping the requirements to 2,500 deg. F. would more than double the percentage of choice in this particular field. The higher fusion temperature, in itself, offers nothing in the way of added value to the coal.

The comparison of coals as to ash fusibility, however, is not as complex as it sounds. Practically all boiler installations can be divided into three general classes according to the minimum

Table I—Heat Balance

Type of Heat Loss	B.t.u. (Per Lb. of Coal)	Per Cent
Heat absorbed by boiler and superheater	8,640	74.0
Moisture in coal and air	140	1.2
Hydrogen in coal	304	2.6
Chimney gases	1,458	12.5
Incomplete combustion of CO	0	0
Combustible in the refuse	690	5.9
Radiation and unaccounted for	443	3.8
Total	11,675	100.0

limits which they set on ash fusibility. The first class, capable of utilizing coals of 2,300 deg. F. fusion temperature and below, is exemplified by the large, modern, pulverized-fuel installations and many of the more modern and better designed stoker installations. The second class, advantageously using coals with a fusion point from 2,300 to 2,600 deg. F., includes the majority of plants, industrial and otherwise. This group includes many plants, large and small, pulverized-fuel fired, stoker-fired and even hand-fired. The third class, requiring coals of 2,600 deg. F. and higher, includes chiefly plants of older design and inefficient hand- and stoker-firing. Practically none of the modern steam plants falls into this class. It must be remembered that in practically all industrial centers high ash-fusion temperature costs money.

The second characteristic to consider in any coal is the volatile matter. This is an indication of the proportion of the coal that will have to be burned in the furnace chamber as a gas. This, together with the rate of coal burning—or, in other words, the velocity of "gasifying"—indicates the length that the burning gas must travel before combustion is completed. Since efficient combustion and the elimination of smoke and soot in the gases discharging from the boiler require that combustion be completed before the hot gases strike the colder tubes of the boiler, older hand-fired and stoker-fired installations with restricted settings are frequently limited in their use of coals of high volatile content.

For purposes of selection, coals may be divided into three general classes as to volatile content. Such division will be of value as indicating the general coal groups which can be used efficiently.

The first of these three gradings may be called the low-volatile group, with volatile content ranging from 15 to 20 per cent. This group includes such coals as the Pennsylvania smokeless coals of Cambria, Clearfield and Somerset counties, as well as the coals of the Georges Creek field of Maryland, and the New River, Pocahontas and Tug River fields of West Virginia.

The second, or medium-volatile, group is comprised of coals ranging from 20 to 30 per cent in volatile matter. This includes the majority of the coals of Jefferson, Indiana and Westmoreland counties, Pennsylvania, some of the coals in the eastern part of West Virginia and a number of the Southern and Southwestern coals.

The third, or high-volatile, group ranges from 30 to 40 per cent volatile content, and embraces the majority of the coals mined in Pennsylvania, including the Pittsburgh seam in the Connellsville field, the coals of northern and western West Virginia and practically all of the Mid-Western coals, such as those of the states of Ohio, Illinois, Iowa and Kansas.

Thus, first dividing all coals into three general volatile groups and further into three general ash-fusion groups, gives nine classes of coals grouped as to these first two important properties. The determination of which class, or classes, of these nine the plant can advantageously handle sets the first broad limits to coal selection; that is, provided this information is intelligently derived and is not merely somebody's opinion. A variety of coals within each class usually will be found available. A variation of a few per cent in volatile content or of a hundred or so degrees in ash-fusion temperature will be found to make no appreciable difference in plant operation.

The best way of determining the relative value of a particular coal to any plant is by a trial of that coal in the plant. Chemical analysis tells of what the coal is composed. The heat value, as determined by calorimeter, indicates the amount of heat available in the coal. These are invaluable aids in determining what the coal *might* do, but they do not necessarily show what it *will* do. Evaporation data, if they are the result of a plant trial, give an indication of what the coal actually *did* in terms of heat made available in that particular plant on a particular test. It is far from being the whole story of the test, however.

It can readily be seen that the evaporation figure is affected not only by the losses resulting from the characteristics of the coal itself but by those resulting from the inefficiency of the equipment. The way in which the equipment is operated during the test also has a bearing. The principal reason for a plant trial of a coal is to determine the effect of its characteristics on plant performance. As a matter of fact, the information needed to segregate the effects of the three different factors in steam generating efficiency—coal characteristics, plant equipment and plant operation—lies in the difference between the amount of heat available in the coal, as shown by its heating value, and the amount of heat extracted from it for useful work, as shown by evaporation.

This difference is the loss incurred in the steam generating process. The logical method of separating this into its various parts is to measure the various losses during the trial and to strike a "heat balance," which sums up the total heat available per pound of coal and shows the distribution of this heat, both in quantity and in percentage, the majority going into the steam produced and the balance distributing among the various losses incurred.

These losses fall into two general classes. The first is known as the inherent losses or those not controllable by plant operation. These include:

1. The loss due to evaporating the moisture in the coal and in the air supply.

2. The loss due to burning the hydrogen in the coal to water vapor. Each pound of hydrogen in the coal combines with oxygen from the air to form 9 lb. of water vapor. While considerable heat is liberated in the process, the water vapor escaping as superheated steam at the flue-gas temperature carries away some of the heat originally contained in the coal just as the moisture from the coal and air does.

3. Radiation from the boiler and furnace setting to the surrounding air.

These losses are relatively small in amount, although in the case of fuels high in hydrogen content, such as natural gas, the hydrogen loss may be an appreciable quantity.

The second class, or controllable losses, are to a certain extent controllable by proper operation, although both coal properties and efficiency of plant equipment play an important part in them. These include:

Table II—Analysis of Fuels

	Coal			
	Illinois Bituminous	Pocahontas Semi-Bituminous	Fuel Oil	Natural Gas
Proximate (Per Cent by Weight)				
Moisture	7.35	1.91	....	....
Volatile matter	36.70	15.93	....	....
Fixed carbon	47.88	77.40	....	....
Ash	8.07	4.76	....	....
Heat value (B.t.u. per lb.)	12,164	14,661	18,600	21,252
Ash fusion point (deg. F)	2,100	2,500	....	....
Ultimate (Per Cent by Weight)				
C	69.00	84.67	84.3	....
H_2	4.50	4.03	12.7	....
O_2	8.47	2.88	1.2	....
N_2	1.59	1.10	....	....
S	1.02	0.65	0.8	....
Ash	8.07	4.67	....	....
Moisture	7.35	1.91	1.0	....
CH_4	....	....	....	80.80
C_2H_6	....	....	....	8.78
CO_2	....	....	....	3.47
N_2	....	....	....	6.95

Table III—Combustion Data

	Coal			
	Illinois Bituminous	Pocahontas Semi-Bituminous	Fuel Oil	Natura Gas
Theoretical air required (lb. per lb. of fuel)	9.19	11.04	14.08	15.34
Excess air used (per cent)	25	25	20	15
Gaseous products (lb. per lb. of fuel)	12.38	14.77	17.881	18.67
Flue Gas Analysis (per cent by volume)				
CO_2	14.8	15.0	12.7	10.2
O_2	4.1	4.0	3.6	3.0
N_2	81.1	81.0	83.7	86.8
Flue-gas temp. (deg. F.)	560	555	550	540
Combustible in refuse (per cent)	9	35	0	0

1. The loss due to incomplete combustion, which accounts for unburned gaseous combustible. The presence of CO in the gases escaping from the furnace means a failure to liberate all available heat in the coal. This may be due to the use of a coal of too high a volatile content. It may also be due to a deficiency of air, to improper mixing of air with coal or to improper operation.

2. Loss due to unburned combustible in refuse. This loss, as the name implies, consists of the solid combustible (principally carbon) which passes unburned to the ash pit or into the boiler setting and out the stack mixed with fly-ash. In general, it increases with an increase of ash content in the coal, and it is materially increased by serious clinker trouble. While it is one of the greatest sources of heat loss in the industrial boiler plant, it can be materially limited by proper furnace operation.

3. The heat carried away by the dry chimney gases. This is the largest of the losses. Whatever heat is left in the gases at the boiler or economizer exit is discharged into the atmosphere. The amount of this loss is largely dependent on the volume of the gases. This volume in turn is not only dependent on the characteristics of the coal itself, such as the portion of water vapor due to moisture and to hydrogen, but is also dependent on the excess air used in burning the coal. Excess air is the largest controllable factor in this loss, although cleanliness of the boiler surfaces also is a controllable factor. Measurement of the amount of CO_2 in the flue gases gives an indication of the amount of excess air.

Table I (preceding page) gives the heat balance of a test made when burning anthracite screenings on a chain-grate stoker. It will give an idea as to how such a balance works out. The heat value per pound of coal used, as determined by calorimeter, was 11,675 B.t.u.

In this case, 74 per cent of the heat originally available in the coal was transferred to the steam, where it could be usefully employed in the plant. The "boiler efficiency" was thus 74 per cent.

Frequently, however, investigation and study of possible plant fuels requires the determination of the relative value of dissimilar fuels.

For this reason, standards of performance for the different basic fuels—what each may be expected to do when fired under most suitable conditions—may be of material value. It should be understood, of course, that a fuel of a different type from that now used may not develop its maximum efficiency in the existing furnace. The use of a different fuel may require changes in the furnace structure, and, certainly, in the firing equipment. The question of additional investment cost enters here, but it will be eliminated from this discussion in the interest of simplicity.

Four fuels—two solid, one liquid and one gaseous—have been chosen to indicate the variations in efficiency of steam production with a wide range of fuel types. Their chemical characteristics are materially different, their heat values per pound drastically so, as will be seen in Table II. Heat values range from 12,000 to 21,000 B.t.u. per pound.

The effect of these fuels on the performance of a particular boiler has been studied and checked against tests and operating performances. Since oil and natural gas can be fired only in suspension, the two coals have been considered as fired in pulverized form.

For complete combustion, each of these fuels requires a certain theoretical minimum of air. Even under the most efficient of actual conditions, however, a certain excess is required to insure completeness of burning. The two coals in this case have been fired with 25 per cent excess air, the oil with 20 per cent excess, and the gas with 15 per cent. These conditions are attainable in best modern practice.

As a result of this excess, gas volumes are larger and CO_2 volume lower than would obtain if the theoretical quantities of air could be used. These gas volumes materially affect the gas temperatures and the loss of heat in the escaping stack gases. Table III shows these differences for the fuels considered.

Considerable difference exists in the completeness with which the combustible of each fuel may be consumed. This is more noticeable in the solid fuels, the losses from this source being too small for consideration with the liquid and gaseous fuels when efficiently fired. With them, however, the latent heat losses become appreciably larger.

The relation and effect of these various factors are shown in the chart, which gives plotted and comparable heat balances for the four different fuels. Radiation loss, a minor factor, is taken at a constant percentage for each. The heat per pound of fuel lost, however, is not the same, since the total heat contents vary with the different fuels. Flame temperatures likewise vary roughly with the heat content, so the percentage loss stays about the same.

Latent heat losses are higher for the Illinois coal than for Pocahontas, due to higher moisture content. The higher hydrogen of the oil and the gas increases this loss rapidly with these fuels. Loss of sensible heat in the dry gases, however, decreases. This is because greater portions of the gases are water vapor whose loss is included under latent heat. Lower flue-gas temperatures, resulting from higher net available heat per unit of gas, also influences this.

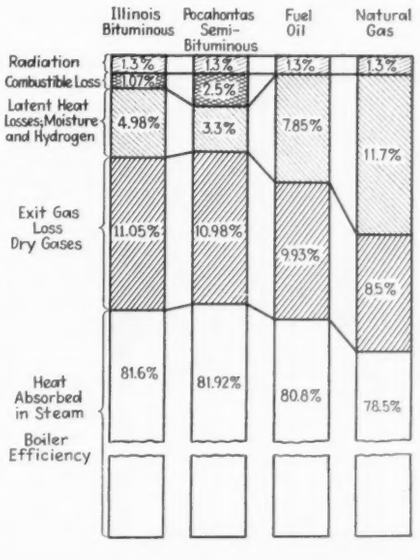
The portion of the heat of each fuel which goes into steam generation varies less than might be expected, because of the additive and subtractive effects of the various losses.

As the chart shows, the efficiencies possible with the two widely different coal types vary less than 0.5 per cent. Oil is only about 1 per cent less efficient, while natural gas decreases some 3.5 per cent below the best with coal. The figures shown, of course, are based on the boiler only. Economizers and air preheaters, if installed, will increase the various efficiency figures further.

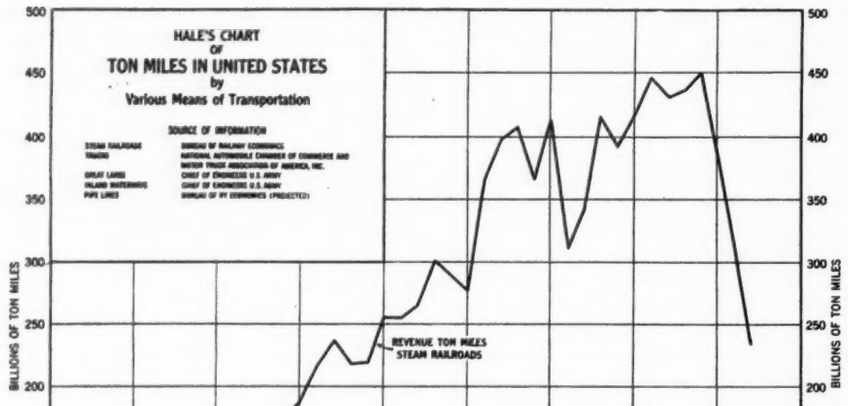
Utilization efficiencies, such as indicated, are possible, of course, only with furnaces and firing equipment capable of realizing maximum utilization under best possible operation. Results will vary considerably with the type and adaptability of the equipment used and with the manner in which it is operated.

In selecting coal it must be kept in mind that the best economy is not necessarily obtained with the cheapest fuel. And it should be remembered that the high-priced coals are not always the most efficient.

Boiler efficiency and heat losses for different fuels.



Public Interest Does Not Demand



The above chart shows conclusively that the proposed public utility regulation of common and contract carrier motor trucks cannot bring back railroad prosperity. For out of the total of 15 billion ton-miles of ALL trucks in 1932 only 750 million ton-miles were handled by common or contract carrier trucks in interstate commerce. This is only ⅛ of 1 per cent of the total of 235 billion ton-miles of all the railroads in 1932.

FEDERAL and state public utility regulation of common carrier and contract carrier motor trucks is not demanded in the public interest. Shippers have not clamored for such regulation. Buyers and sellers of merchandise and agricultural products have made no demand for protection from any exactions by the motor trucking industry. There can be only one major justifiable reason for such regulation and that is for the benefit of the public. Since the public has not yet demanded it, there can be no justification at this time for such legislation.

In fact, the public as represented by many companies in the food field such as dairies, fruit and vegetable growers, meat packers, brewers and others are definitely opposed to such regulation, because it would increase their collection and distribution costs without compensating advantages.

Warn Against Taxes That Will Handicap Progress

The case against public utility truck regulation is well summarized in the following quotation from the report of the National Transportation Committee, of which the late Calvin Coolidge and Alfred E. Smith were members:

Automotive transportation should be put under such regulation as is necessary for public protection. It should bear its fair burden of tax, but only on a basis of compensation for public expenditure on its behalf plus its share of the general tax load. Neither tax nor regulation should be applied for any purpose of handicapping the march of progress for the benefit of the railroads.

One thing is certain. Automotive transportation is an advance in the march of progress. It is here to stay. We cannot invent restrictions for the benefit of railroads. We can only apply such regulation and assess such taxes as would be necessary if there were no railroads, and let the effect be what it may.

No Public Demand for Truck Regulation

The Interstate Commerce Commission on page 20 of its 1932 annual report states:

(a) There is substantially no demand for public regulation of the charges of motor trucks to protect shippers against exorbitant or discriminatory charges. The demand has been chiefly from the railroads, and for the prescription of minimum rather than maximum charges.

(b) Indications are that the number of motor truck operators is very large and that their operations are mostly on a small scale. Regulation which is appropriate and practicable in the case of a comparatively few large well-organized companies may be quite impracticable in the case of a multitude of individuals or small concerns.

Motor freight transportation of itself cannot become a monopoly. This automatically bars regulation of a monopolistic character. Whenever a shipper decides that a rate is too high or the service inadequate, he may buy his own trucks and obtain the exact service he desires.

The policing of the highways for the safety of the public or to prevent damage to the roads does not come within the scope of public utility regulation. Such work must remain solely a police power. Regardless of its type of ownership, any truck which is too large, too heavy, or travels too fast can do an identical amount of damage to the highways as other users of the roads.

Produce Industry Benefited by Economy of Truck Transportation

THE motor truck has taken its place as an important means of transportation of fruits and vegetables to market, not only locally but to an important extent in interstate movement. Entirely aside from the economic benefits which the general adoption of the motor truck has brought to the growers and the changes made necessary in the marketing field in contrast with the period when all shipments were made by railroad, the use of trucks in the specialized fruit and vegetable transportation business has brought other important problems of truck and body selection, operation and maintenance.

The problems of maintenance are akin to similar problems in other industries in which the same sizes of trucks are employed. Maintenance problems for the same make, type and capacity of truck are much the same in all industries, for maintenance costs on identical vehicles vary more nearly with the mileage run than with any other factor. It is primarily in the *selection* and *operation* of trucks that problems incident to fruit and vegetable haulage differ from

Motor Truck Utility Regulation

corresponding problems in other industries.

Broadly speaking, the work of fruit and vegetable haulage by truck may be divided into three parts: that by the peddler, itinerant or otherwise, who picks up his load where he finds it and disposes of it where it will bring the highest price, be it market, dealer or final consumer; that of the merchant grower who trucks his own goods to market; and that of the common or contract-carrier truckman who may mix fruit and vegetable shipments with other commodities or make a special business of hauling fruit and vegetables.

It is evident that no one type of truck or body will suffice to meet economically the varying conditions enumerated. However, every such truck should be pneumatic-tired, no matter what its size. Even if it were not practical to buy anything but pneumatic-tired trucks in regular models, except in the heavier tonnages, they should be so equipped for fruit haulage to give to the load better protection against bruising.

Collapsible Framework an Aid in Displaying Goods

The most convenient design of peddler's truck body is a flareboard express type with a canopy top and side curtains. The top serves to protect the load against the sun and the side curtains to protect it against the rain. Rear-wheel housings may be employed to permit a low body floor for curb selling. Some of the more progressive peddlers are now using a collapsible framework set up inside the body so that the boxes of fruit may be better displayed on a slant to either one or both sides of the body.

The same general type of body is suitable for the merchant grower who hauls his own loads to market, although the truck chasses vary from 5- to 7-ton capacity, while the peddler's truck usually ranges between ¾ and 2 tons. If the grower's truck is used as an all-purpose vehicle on the farm, the canopy top may be removable. In cases when the hauls are all made at night, an open body may be used with the load covered by a tarpaulin.

In common and contract carrier hauling, a closed type of body is preferable. If fresh fruits and vegetables are to be handled exclusively and the routes are long (from 100 to 200 miles), a refrigerated body should be used. Refrigeration may be provided by solid CO_2 or by a mechanical unit.

● These two pages are devoted to the important subject of motor transportation in the food industries. Watch for timely data on fundamental phases of truck purchase, operation and maintenance. These pages are open to our readers for discussion of automotive problems.

Trucks Offer Brewers Means to Reduce Their Distribution Costs

IN THE 13-year period since the legal banishment of beer, truck transportation has made great strides which present-day brewers may utilize for a more economical distribution of their product. In former days beer was shipped by rail or interurban electric lines to near-by distributing points, at which it was unloaded, handled, and reloaded for final delivery to dealers.

Now, with high-speed, pneumatic-tired trucks or tractors hauling loads up to 10 tons, deliveries may be made direct to dealers at greater distances in less time and at less expense because of the elimination of labor rehandling charges.

New uses of smaller trucks in retail deliveries await the regulations being set up in the various states. In this work, as also in the handling of wholesale business, the principal advances will be made in the development of light, strong vehicle bodies designed to reduce loading and unloading times. New labor-saving devices, on and off the bodies, will be employed to reduce the time and the expense of such load-handling operations.

Low-frame trucks to lessen the body loading and unloading heights will become more popular. For all except short-haul routes, pneumatic-tired trucks will be the rule rather than the exception.

It is quite possible that future development of beer storage at retail outlets in relatively large volume will result in the bulk transfer of beer in suitably lined motor vehicle tanks similar to those used today for the handling of fluid milk.

A type of high-speed, large-load tractor and semi-trailer which brewers will find of great value in increasing their sales area through quick service and low distribution costs with a minimum of handling charges. The tractor is an International 2-ton model. The semi-trailer is a Fruehauf dropped-frame model with a closed body 20 ft. long by 8 ft. wide over all by 6½ ft. high. It has a 9-ton pay-load capacity, which is equivalent to about 600 cases of beer.

BOOK REVIEWS

CONFECTIONERY STANDARDS. By Stroud Jordan. Published by Applied Sugar Laboratories, Inc., 109 Wall St., New York, N. Y., 1933. 370 pp.. 6¼x9¼; cloth. Price, $5.

FOR more than 25 years the Food and Drug Administration has been setting up standards by which foods shall be judged. Curiously, these standards range from explicit detail in respect to raw materials used to the broadest of generalities for the finished product.

It is the purpose of this volume, known as Confectionery Studies No. 2, to acquaint the confectionery industry with the existing standards as they apply to confections and to suggest how these and additional standards can be really definitive.

Although dedicated to the confectionery industry, this study is of much value to all food manufacturers. The author has reviewed every raw material used in confectionery manufacture. The source, composition, method of preparation, and Food and Drug Administration standards of these materials are dealt with preliminary to discussing the kinds of confections, their characteristics, and the standards by which they are known or should be judged. Included is an appendix giving the regulations and food inspection decisions for enforcement of the Federal Food and Drug Act, the adjudged adulterations of confectionery materials, and the books and reports used for reference. Subject and topical indexing is used.

* * *

INTERNATIONAL UNEMPLOYMENT. Published by the International Industrial Relations Institute, The Hague, Holland, 1932. Obtainable in the United States through I.R.I., Room 600, 130 East 22d St., New York, N. Y. 496 pp., 6½x9½; cloth. Price, $2.50.

UNEMPLOYMENT is not peculiar to the present period of business depression. It has been a recurring problem for several decades and as early as 1914 had begun to attract sufficient attention to be included in public reports. It is only since the World War that studies have been available for international comparisons.

In this volume are included studies of fluctuations in employment in Australia, Canada, China, Germany, France, Great Britain, the United States and Russia between 1910 and 1930. In addition to being countries in which investigators were already at work on employment problems, these countries represent regions of surplus resources and production, of incomplete resources and restricted markets, and of new industrialization.

Following the war there was a temporary increase in unemployment, but it was not until 1930 that employment and earnings reached their lowest point during the period in which comparable statistics were kept. In this 1910-1930 period France was not seriously affected, although even there unemployment was increasing in 1930. Soviet Russia not only lacked unemployment but actually had a shortage of labor and has continued to have it up until the present. Industrially backward China presents a problem singular to itself because of fear of exploitation, which in the light of 1933 events is not groundless.

The publication of this contribution to the World Social Economic Congress at Amsterdam in August, 1931, is to be followed by another contribution entitled "World Social Economic Planning."

* * *

INDEX TO THE LITERATURE OF FOOD INVESTIGATION, VOL. IV, Nos. 1 and 2. Complied by Agnes Elizabeth Glennie, Department of Scientific and Industrial Research, Food Investigation Board. Published by His Majesty's Stationery Office, Adastral House, Kingsway London W.C. 2, as of March and September, 1932. No. 1, 136 pp.; No. 2, 182 pp.; 6x9⅜; paper. Price, 2s. 6d. each.

TWICE each year the Low-Temperature Research Station, Cambridge, England, issues to other research institutions of the British Empire lists of titles of useful published articles with very brief abstract of each. Authorized by the Imperial Research Conference held October, 1927, this service is for the purpose of keeping these institutions informed on progress in the preservation and transport of food.

These indexes are valuable to any worker in the food field in search of information on investigations reported in scientific and technological publications during 1929-1931. However, a thorough search for literature references should include Chemical Abstracts—A.C.S. and British—and Industrial Arts Index. In the United States copies of the indexes are obtained through the British Library of Information, 270 Madison Ave., New York, N. Y.

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FOODS IN HEALTH AND DISEASE. By Lulu G. Graves. Published by Macmillan Co., 60 Fifth Ave., New York, N. Y., 1932. 390 pp., 6x8¾; cloth; illustrated. Price, $3.50.

ENCYCLOPEDIC in character, this book contains much general information on foods and food materials for the manufacturer of and the dealer in food materials as well as for the food consumer.

In the first section, entitled "Foods in Health," the author devotes a chapter to each of the eight general divisions of foodstuffs, such as vegetables, fruits, sugar, nuts, foods of animal origin, fats, beverages and the like. The individual members of each of these general classes are named and described as to origin, general properties, and value as a food. Many illustrations aid in these descriptions. While not as pretentious or as cumbersome as Ward's Encyclopedia of Foods, this volume serves much the same purpose. It is more complete in some respects and certainly is more up to date in the information it contains and in the number of food materials dealt with.

A helpful appendix classifies the various food materials according to their vitamin content and according to their nutritional and food values.

Printed on exceptionally heavy white paper and with well-defined type faces, the text material is easily read and the illustrations are unusually good. A well-organized cross index adds to the value of the book.

* * *

THE AUTOMATIC CONTROL OF REFRIGERATION. By H. T. Lange and A. B. Schellengerg. Published by Alco Valve Co., 5707 Manchester Ave., St. Louis, Mo., 1932. 98 pp., 6x9; paper. Price, $1.50.

A PRACTICAL discussion of some of the important devices used to control the refrigerant in various types of refrigerating systems and unit coolers is the theme of this handbook. It begins with a chapter of general information on refrigeration and in subsequent chapters deals with filtration, expansion valves, float valves, electrically operated valves, automatic control of circulating brine and of unit coolers, and electrical wiring diagrams for control systems.

The authors handle their subject in a sound, practical, lucid manner. They describe the construction of the various control mechanisms, point out their advantages and limitations, give instructions for installing and adjusting them, and mention troubles that may occur, and the causes.

* * *

SPICES AND CONDIMENTS. By H. S. Redgrove. Published by Isaac Pitman & Sons, 2 West 45th St., New York, N. Y., 1933. 361 pp., 8⅝x5¾; illustrated; cloth. Price, $4.50.

FOOD and flavoring manufacturers have long felt the need for a book devoted exclusively to these much used ingredients. Redgrove has classified them into five groupings and included much information pertaining to their botanical origin, chemical composition and uses. Chapters devoted to the philosophy of spices as well as to the mechanical means by which they are prepared for use comprise the first section of the book. Listings in three indexes—botanical, chemical and general—assure ready reference to the spice of interest whether it be a root, a bark, a flower, a fruit or a seed spice.

* * *

ALMANAC OF THE CANNING INDUSTRY. Published by The Canning Trade, Baltimore, Md., 1933. 178 pp., 5⅞x8¾; paper. Price, $1.

THE 18th edition of this annual handbook of the canned-foods industry is now available. In addition to compiled data from the U. S. Department of Commerce pertaining to canned and preserved foods, full information is given on the National Food and Drug Act and the McNary-Mapes amendment. It also includes requirements for the fill of all containers, standards for canned foods so far adopted, the tentative standards now under consideration, as well as much other information valuable to members of the canned foods industry.

ABSTRACTS OF CURRENT LITERATURE

THE FREEZING-POINT OF PASTEURIZED AND STERILIZED MILKS. G. D. Elsdon and J. R. Stubbs. *Analyst,* Vol. 58, pp. 7-10; January, 1933.

A general impression seems to prevail that processes of pasteurization and sterilization, when applied to milk, tend to reduce the freezing-point depression appreciably. Further experimental results show that there is a slight tendency for this value to be decreased when the milk is heated, but the change is so small that it does not interfere with the value of the test (A.O.A.C., "Methods of Analysis," 3d ed., p. 219) when applied to milks which have been heated.

* * *

COD LIVER EMULSIONS. E. R. James, H. F. Grover and E. J. Quinn. *Proceedings of the Society for Experimental Biology and Medicine,* Vol. 30, pp. 516-519; January, 1933.

Further experiments prove that the vitamin A value of cod liver oil may be considerably enhanced by a process of emulsification which is described. In this work the emulsion consisted of 22 per cent by weight of cod liver oil and 78 per cent by weight of concentrated malt extract.

* * *

MILK PASTEURIZATION AS A TECHNICAL PROBLEM. W. G. Savage. *Journal of Hygiene,* Vol. 33, pp. 42-54; January, 1933.

This extensive discussion includes the topics of: type of pasteurization to adopt; problems of "Holder" type of pasteurization such as leakage, foam, dead ends and other defects; bacteriological standards for pasteurized milk.

* * *

LARGE-SCALE LABORATORY CULTIVATION OF MOLDS. W. H. Peterson and others. *Industrial and Engineering Chemistry,* Vol. 25, pp. 213-215; February, 1933.

An apparatus (sterilizer-incubator) and fermentation procedure for the growth of molds in pure culture on a large scale in the laboratory are described. Results for the conversion of glucose are 16 to 23 per cent, depending on the species of mold and fermentation procedure used.

* * *

HARDENING FATS. H. I. Waterman. *Chemisch Weekblad,* Vol. 30, pp. 174-177; Feb. 25, 1933.

By careful control of temperature, pressure and degree of catalyst activity in the hydrogenation of animal and vegetable fats and oils, almost any desired result can be obtained. Low-temperature hydrogenation is particularly important in the hardening of edible fats, because it does not destroy sensitive components such as carotin, vitamin A, vitamin D and the like. A curve chart is shown, in which the saturated fatty acid content is plotted against the iodine number of the fatty acids. By proper control of conditions, the hardening of a fat can be made to follow with reasonable accuracy a predetermined course on such a curve chart; and the producer of edible products should by all means take advantage of this improved control to avoid exposing his materials to unnecessarily severe conditions.

* * *

HIGH DOSES OF IRRADIATED ERGOSTEROL. J. T. Hauch. *Proceedings of the Society for Experimental Biology and Medicine,* Vol. 30, pp. 475-476; January, 1933.

Further work in testing the toxicity of irradiated products shows that, in general, the more complete and better balanced diets act in a more protective manner.

* * *

THE EFFECT OF METALS ON THE VITAMIN CONTENT OF MILK. M. Schieblich. *Deutsche Nahrungsmittel-Rundschau,* Vol. 19, p. 150 (1932). [From *Chemical Abstracts,* Vol. 27, p. 143; Jan. 10, 1933.]

Milk was pasteurized in copper, aluminum and nickel vessels and a small quantity of these metals was taken up. Copper destroyed vitamin C, while aluminum had no effect. Nickel had no effect on the vitamins A, B and C.

* * *

CHEMICAL CHANGES IN THE FAT OF FROZEN AND CHILLED MEAT. PART IV—PROTECTIVE INFLUENCE OF CARBON DIOXIDE ON THE FAT OF BEEF STORED AT 0 DEG. C. *Chemistry and Industry,* Vol. 52, pp. 9T-12T; Jan. 27, 1933.

Experiments show that carbon dioxide has a marked effect in retarding the onset of taint in beef fat at 0 deg. C. Use of 10 per cent of carbon dioxide in a saturated atmosphere caused a doubling of the time required for the production of a perceptible "off" flavor. Little advantage results from increasing the carbon-dioxide concentration beyond 15 or 20 per cent.

* * *

TIN POISONING. Gulbrand Lunde, Valborg Aschehoug and Hans Breien. *Tidsskrift for Hermetikindustri,* Vol. 19, pp. 63-66; February, 1933.

In a search for evidence for or against the toxicity of tin introduced into the body by eating canned foods, feeding experiments were made with rats. The test animals were fed in two series, one with tinned sardines in oil and the other with sardines in oil which had been canned in aluminum. The controlled tin content for the one series was about twice as great as the 2 grains per pound which is the maximum commonly allowed by the food laws in English-speaking countries, and about 5 to 20 times as great as the tin content commonly found in tinned sardines. Based on body weight, the quantity of tin administered to the rats was about that which a man would receive by eating approximately 6 lb. of tinned sardines (of the usual tin content) per day. The test was continued for 35 days. Almost all the ingested tin was found in the excrement of the test animals, and there was no evidence of toxicity. It is concluded that there is no hazard of tin poisoning in the consumption of canned fish.

* * *

GAS STORAGE OF FRESH FISH. F. P. Coyne. *Chemistry and Industry,* Vol. 52, pp. 19T-24T; Jan. 27, 1933.

Further experiments on the effect of carbon dioxide on bacterial growth are reported. Optimum preservation of fish was obtained at a carbon-dioxide concentration of 40 to 60 per cent.

* * *

THE "IDEAL" CHEMICAL PRESERVATIVE FOR FOODS. T. Sabalitschka, *Zeitschrift. für Ernährung,* Vol. 2, pp. 202-208; 1932. [From *Nutrition Abstracts and Reviews,* Vol. 2, p. 507; January, 1933.]

A general discussion and a review of the literature upon the subject, as a result of which the author suggests that the ethyl and propyl esters of para-hydroxy benzoic acid best fulfill the conditions which he lays down for an "ideal" preservative.

* * *

DISINFESTATION AND DISINFECTION. J. du P. Langrishe. *Journal of Hygiene,* Vol. 33, pp. 28-35; January, 1933.

Experiments on the use of a pressure steam disinfection for disinfestation and disinfection, by dry heat and/or gaseous disinfectants show the following: Contact with dry heat at 55 deg. C. for 1 hour cannot be relied upon to sterilize infective material; lice and bugs can be easily destroyed by dry heat at 55 deg. C. acting for 30 minutes; infective material (non-sporing organisms) can be disinfected by penetration of dry heat at 50 deg. C., followed by formaldehyde, 5 per cent, allowed to act for 1 hour.

* * *

GELATIN. J. H. de Boer and C. J. Dippel, *Chemisch Weekblad,* Vol. 30, pp. 222-223; March 18, 1933.

Gelatin in its B state (in which it can form a jelly) is crystalline—that is, its X-ray diagrams reveal a definite orientation of the micelles. In its A state (non-jelly forming), the absorption of light in water solution is such that exposure to light causes changes in the viscosity of the sol; but these changes apparently are not related in any way to the transition from the A to the B state. A very dilute sol at the isoelectric point will not form a jelly when cooled, even though the gelatin is in the B state; after a few days the gelatin is precipitated by flocculation. This is a perfect example of syneresis. A somewhat more concentrated sol will not set to a jelly directly after cooling, but does so as a result of after-effects.

NEW PRODUCTS
NEW METHODS

Dehydrated Vegetable Soup

Dehydrated vegetables and cereals mixed in the proper proportions for vegetable soup have been announced by Edwards & Tillinghast, Memphis, Tenn. Soaking for three or more hours in water converts these vegetables into the equivalent of fresh vegetables, the manufacturer reports. To prepare the soup, the cook adds the soaked vegetables to a soup stock made of meat and cooks until the vegetables are tender, seasoning with salt and pepper. A small triangular package contains enough vegetables to make soup for six. The container is wrapped in transparent cellulose and has a display window.

Petite Bacchante, 3.2 Wine

Not to be outdone by the brewers, California Fruit Juice Co., Ltd., San Francisco, plans to market a 3.2-per cent wine. Both red and white will be sold under the trade name "Petite Bacchante." This wine is not a beverage made by the addition of carbonated water to real wine to bring it within the legal alcoholic limit, but is a real wine reduced to 3.2 per cent by the addition of grape juice. This is asserted to give the body and aroma desired. The wine will be packed in pints with a crown cap. If and when—mostly when—real wine becomes legal, the company will market it under the name "Grande Bacchante."

"Form Fitting" Cooked Ham

No trimming is required in preparing sandwiches from the cooked ham packed in the new container of Armour & Co., Chicago. The rectangular shape of the container does the trick. In making this new Armour product, Fixed Flavor Star Hams are fully boned and almost completely defatted, so that when finished they weigh from 6 to 6½ lb. After preliminary processing and cooking, a solid piece of ham, molded to form, is

put in the tin, sealed and cooked in its own juice.

The smallest of the new tins contains about 1¾ lb. of meat; the largest, up to 5¾ lb. About 90 per cent of the content is meat and the remainder, juice. The container has a base 4⅛x3⅜ in. and comes in five lengths—4, 6, 7¼, 10 and 11¼ in. The lengths accommodate quarter, half, and whole hams of medium weights.

Ice-Box Cookie Dough

Ice-box cookie dough has been placed on the grocery and bakery market in British Columbia by Canadian Window Bakeries, Ltd., operators of one of the largest chains of bakeries and agencies in western Canada. Prepared in a long roll, the dough is wrapped in transparent cellulose in lengths sufficient to produce six dozen ice-box cookies. This dough is to be cut into thin slices and baked in a hot oven for three to five minutes. It is prepared in assorted flavors and sold for stock in refrigerator compartments or cold-storage boxes. The line is reported to have met a wide public demand.

Parched Corn Rivals Pretzels

Introduced by World's Products Co., Spencer, Ind., parched corn is being promoted as a "chaser" for beer, making it a contender for the great market recently opened for pretzels and potato chips. Known as Korn Parchies, the product is made from dry, uncooked sweet corn heated in coconut oil to 400 deg. F. and then drained and cooled to harden the oil. A liberal sprinkling of salt completes the product. The process is patented.

The sweet corn confection is packaged in transparent, yellow glassine bags, retailing for 5 cents, and in 8 oz. cans. It is also distributed by vending machines. Display cards for the packages feature the "have you tried them with beer" appeal. Wholesalers in almost every part of the country are distributing Korn Parchies.

Syrup 100 Per Cent Soluble

Chocolate-flavored syrup with 100 per cent solubility and the property of not settling out under any conditions has been developed by Choice Foods, Inc., Detroit, Mich. Another asset of this syrup is that the manufacturing process removes virtually all the theobromine, suiting it to the anti-theobromine diet. Solco syrup is reported to have a favorable effect upon the digestibility of milk in that it softens the curd. The Choice Foods syrup can be mixed with milk with no extra equipment or special treatment and it can be added at any stage.

Canned Jellied Salads

After perfecting a vegetable gelatin that will blend with other foods and stand cooking and sterilization under pressure, without losing its jelling quality and flavors, The Family Kitchen, Inc., San Francisco, Calif., is placing on the market jellied chicken, tuna and vegetable salads. These products, bearing the trade name "High-Noon," are to be followed by jellied fruit salad and other combinations. The salads are put up in 10½-oz. cans, ready to serve.

The gelatin used in making these foods will stand up under a temperature of 250 deg. F. while being sterilized and will withstand any climatic condition or heat up to 180 deg. F, before melting, it is asserted. The salads are attractive in appearance and are held to be exceptionally palatable, since all the liquid juices and bouillons are saved by solidifying and incorporating them into the jelly.

Bread Flavored With Honey

Business is picking up for the busy bees. Formerly consumed only in the comb or as a pure strained product, honey is now becoming popular as a flavoring and sweetening agent for other foods. One of the latest honey products is the Honey-V bread baked by Huber Baking Co., Wilmington, Del. Pure

honey comprises the only sweetening agent used in the manufacture of this bread, and the product takes on a honey flavor.

Fruit Treated in Cars

To prevent oranges from molding, some of the California shippers are administering a gas treatment to the fruit after it is wrapped, packed and actually sealed up in refrigerator cars. The gas, consisting of chlorine and ammonia, is injected into the cars through the drip vents. There had been some difficulty in making the treatment strong enough to be effective and still not harm the color of the wrapper or of the lithographed box labels, but this is said to have been overcome.

The advantage of this process lies in the fact that after the food is treated there is no further danger of contamination before it reaches its destination. If the fruit is treated before being wrapped and packed, it is likely to come in contact with mold spores during the various handlings on the packing line-up.

Details of the treatment and its success are not available as yet, but probably will be released soon.

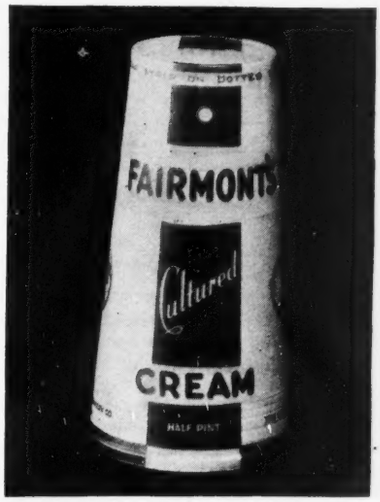
Label Used to Hold Paddle

Labels can be made "useful" as well as ornamental. This has been demonstrated by the new mustard jars of Plochman & Harrison, Chicago. To solve the problem of attaching a wooden paddle to each package, this company adopted a glass jar with a vertical groove in the front side. With the label pasted

over it at the center of the jar, the groove provides a convenient holder for the wooden paddle, and the complete package forms an attractive unit. This jar, appropriately named the "Pad-L-Jar," is the product of Owens-Illinois Glass Co.

Bottom-Filled Paper Bottle

Another type of paper bottle has made its appearance in the dairy industry. The Fairmont Creamery Co., New York, recently adopted a tamper-proof, easy-opening paper bottle for its cultured cream. Developed by Mono Service Co., Newark, N. J., the container is made with two perforated rings around the top, and is opened by pulling on a tab to tear the paper along the perforation. The bottles are manufactured with the cap sealed in the top and they are filled from the bottom. The bottom piece is then inserted and the bottle is



sealed by a machine that crimps the bottom and the sides. The Fairmont Creamery receives the bottles from the manufacturer in nested form, and the bottom pieces come in a cylindrical container that fits the automatic sealing machine.

Another Canned Orange Juice

"Nothing is added; nothing is taken away" is the slogan used by Stephens Packing Co., Upland, Calif., to describe the process which it developed for canning orange juice. By the Stephens method, the fruit juice is packed orchard fresh without being cooked or frozen, and it is sealed in the can within about 1½ minutes after extraction. The rapidity of the process is said to insure retention of the original flavor and vitamin content of the juice.

Although the details have been kept secret, it is known that the juice is treated by combination mechanical and ultra-violet processes which "arrest oxidation of the juice when it is sealed in the cans." The juice goes under vacuum immediately after leaving the reamer and it is kept there most of the time until it reaches the cans. The juice is at 40 deg. F. as it enters the cans, and as soon as the cans are sealed, they are put through a warm bath, presumably to kill mold spores. On account of the mild temperature, the bath does not affect the flavor, it is asserted.

The Stephens process is said to be applicable also to other fruit juices.

New Jar for Mayonnaise

Swift & Co. has adopted a new package for its mayonnaise, and a new name as well. The name is Brookfield, well known from its application to butter, eggs and cheese. The container is a smooth glass jar with slightly tapering sides that not

only add attractiveness but afford convenience in removing from cartons and in handling in the store.

Swift's Brookfield Mayonnaise is sold in half-pint, pint and quart sizes.

Show Window for Tin Cans

No longer will sales of foods packed in tin cans suffer from lack of eye appeal. Packers are now disclosing the contents of their tin cans by a dome-shaped glass display unit which clamps to the top of the can. The small quantity of food packed in the display unit is suspended in a transparent jelly-like preservative which maintains the color and consistency of the product.

Visual Display Co., Chicago, created the display. It is sealed with a tamper-proof Phoenix cap.

THIS MONTH

JUNE

1-Nov. 1—Dairy Industry Exhibit, A Century of Progress, Chicago, Ill. H. E. Van Norman, chairman of organization committee, 221 North La Salle St., Chicago, Ill.

5-10—American Association of Cereal Chemists, annual meeting and exhibit, Medinah Athletic Club, Chicago, Ill. M. D. Mize, secretary, 833 Omaha Grain Exchange, Omaha, Neb.

5-10—Operative Millers' Association, annual meeting and exhibit, Hotel Sherman, Chicago, Ill. C. W. Partridge, secretary, 516 Board of Trade Building, Kansas City, Mo.

11-13—Certified Milk Producers' Association, joint meeting with American Association of Medical Milk Commissions, Milwaukee, Wis. Harris Moak, secretary, 360 Park Place, Brooklyn, N. Y.

18-20—New England Bakers' Association, New Ocean House, Swampscott, Mass. Horace D. Likins, Stateler Bldg., Boston, Mass.

19-21—National Macaroni Manufacturers' Association, Edgewater Beach Hotel, Chicago, Ill. M. J. Donna, secretary, Braidwood, Ill.

(Continued on following page)

Hors d'Oeuvres

SALES of home-brew ingredients have increased in certain localities since people began sampling beer made by brewers that know how. This means that quality has won new converts to the beverage. If they weren't new converts, they'd know better than to try home brew.

•

BY COMBINING ordinary sugar with alcohol and a little nitrated sucrose, a Prague chemist has produced a new motor fuel. Shall service station salesmen of the future be greeted with "Fill her up with Domino"? Another new use for sugar is in the manufacture of fragrant lacquer.

•

EMERGENCY rations cached in Polar regions in 1900 were recently found in good condition. As to the longevity of this food, any doughboy familiar with this type of "iron ration" probably would remind you that iron has been known to keep much longer than 33 years.

•

THE ARTICLE on rat control in this issue overlooks a great invention. Massachusetts Tech students have connected a "cannon" and a photoelectric cell in such a way that Mr. Rat is put on the spot as he ambles down his favorite pathway and intercepts the light beam. For economy's sake, the "cannon ball" is tied to a string.

•

A GERMAN farmer on the Bay of Kiel operates a dairy in which milk is obtained from sea cows. It isn't known whether he herds the animals with dog fish, but anyway, he obtains about 75 quarts of milk daily from each sea cow. And this milk has proved excellent for butter and cheese.

What Food Men Are

Processing taxes delayed—Support Consent decree—Fishermen on continues—Bootleg law—

PROCESSING taxes on wheat, hogs, field corn, milk and milk products, rice, cotton and tobacco, as provided in the Farm Relief bill signed May 12 by the President, have been held in abeyance. Because of the American pledge of a tariff truce pending the outcome of the World Monetary and Economic Conference in London, June 12, Mr. Roosevelt instructed Secretary Wallace not to undertake any program of acreage reduction or taxation on processing without his consent.

With this delay there will be difficulty in putting the law into full effect this year. A large percentage of the crop acreage has already been planted, and any acreage reduction would mean actual destruction of crops. However, just what will finally be done is uncertain.

PRESIDENT ROOSEVELT'S National Industrial Recovery Bill provides the trade groups a long needed opportunity to help themselves, in the opinion of many food manufacturers. Associated Grocery Manufacturers of America characterized the legislation as marking a new public policy toward industrial cooperation which promises constructive results of great value to the trade and the public. National Preservers' Association believes enactment of the bill will give the industry an opportunity to eliminate many unfair and wasteful practices which have largely produced the present distressing situation.

Under the provisions of the bill, an industry may formulate a code of fair practices, which, when approved by executive authority, becomes binding upon all in the industry. Violation of the code will be a misdemeanor, punishable by fines or revocation of license. The President has authority to formulate codes for those industries which do not draw up their own.

SIX MAJOR changes in the food and drug law are desired by the Department of Agriculture. Numerous minor changes probably will also be asked. In each of the following particulars, administrative officials will ask that new authority be granted:

1. The administration wants to define slack-filling of containers as adulteration. It has for years acted against deceptively sized containers. It desires more specific authority.

2. Legal standards can now be fixed by the Secretary of Agriculture only for certain specifically named commodities; canned goods, for example. The department wants this authority for all types of foods.

3. Distinctive names, such as "Bred-Spread" for a fruit preserve, at times afford escape from regulation or prevailing standards. The department wishes this leak in authority eliminated.

4. New authority to regulate cosmetics and toilet articles containing poisonous substances will be asked. If granted, the result will be elimination of certain toxic constituents unless "Poison" labels are used. These latter are hardly likely.

5. More severe penalties, growing progressively higher for repeated offenders, will be asked. Even first offenders in cases like "Ginger Jake" poisoning would be heavily penalized under new schedules to be proposed .

6. Authority to supervise advertising will be asked in order that the department may proceed against advertisers for improper advertising. The same scope of authority now had with respect to labels on packages is wanted, but the penalties would be court action, whereas present label procedure is by seizure of goods.

REQUIRED by the Packers' Consent Decree to close out their business in lines other than meat by June 15, Swift & Co. and Armour & Co. may seek to arrange an extension in which to complete disposition of their stocks of canned goods and their financial interest in other companies.

The packers have substantially reduced their food stocks, but less progress has been made in severing financial affiliations renounced by the consent decree. If the divorce of their ramified interests is not completed before the dead line, they will seek to obtain a month or two more.

The Consent Decree, dating from 1920, was entered in the Supreme Court of the District of Columbia on June 15, 1932. It specifies that meat packers dispose of their "unrelated lines" and their interests in any establishments producing or dealing in those lines.

SALMON canners in the Columbia River district have seen almost a month of the new season pass with practically no fish to pack. The fishermen refused to supply salmon for less than 8 cents a pound for raw stock. The packers paid 6 cents last season and attempts were made to compromise at 7 cents, but only a minor group of the fishermen, those on the upper river, were receptive.

What has made conditions worse, cannery workers sympathized with the fishermen and joined their cause, bringing the number of strikers to more than 4,000. Not only that, but trollers all the way from Canada to California have been on a strike, lending encouragement and even assistance to the river fishermen.

Doing and Saying

recovery bill—Food law proposals—strike—Apples held—Milk war Manufacturers criticized

Last reports indicated an approaching crisis. Fishermen were threatening to establish a cooperative packing plant and packers were still refusing to pay 8 cents.

APPLES worth at least $1,000,000 are virtually in quarantine in the Yakima and Wenatchee districts of Washington. And before they are released into interstate commerce, shippers must prove that lead residues on the skin are not large enough to constitute a hazard to public health. The cause of this unfortunate situation lies in the adoption, in 1932, of an "improved" process for eliminating arsenic residues on the fruit. This process employed either tri-sodium phosphate or a soda ash solution, rather than the usual dilute hydrochloric acid solution. This eliminated arsenic, but not lead. As a result, the inspectors of the Department of Agriculture found much fruit with from 5 to 15 times as much lead as is safe.

This situation was noted in late October and a warning was sent out in November. But suspected apples continue to move here and there and seizures were made, shipments being condemned and destroyed.

As a result of the situation, Assistant Secretary Tugwell issued an order on April 2 announcing that not only apples but all other foods would have to meet the limitation of 0.014 grain of lead per pound to avoid seizure, effective with products shipped from the 1933 growing season. Growers protested this order and asked for a rehearing, but the department stands pat.

Milk With Personality

By a newly developed process, milk bottles at last may be given individuality. Monograms and distinctive lettering can be fused into the glass in red, blue, green or orange. Washing in alkali solutions does not affect the coloring.

DAIRY producers in Wisconsin led the hostilities in the country's milk war during May. And by the middle of the month they were dumping so much milk in the eighteen affected counties that the National Guard was called upon to use stern measures. The strikers broke into a number of small cheese factories in Milwaukee May 15 and destroyed several thousand pounds of cheese. On May 20, after a week of fighting with National Guardsmen, the last remaining pickets went back to their farms.

In New York State, the producers fared better. To avoid a threatened strike, the State Milk Control Board raised the minimum price for home-delivered milk from 10 to 11 cents on May 10. Three days later, the price to producers within a radius of 200 miles of New York City was placed at 4 cents a quart for class 1 fluid milk. And on May 19, railroads cut rates on milk shipped to New York City by 19 per cent.

In the Chicago milk shed, Pure Milk Association, Milk Council, Inc., and Chicago Milk Dealers' Association, which handle more than 75 per cent of the fluid milk in that area, drafted a control plan and submitted it to the Secretary of Agriculture. The plan provides for price and production control. A hearing on the plan was scheduled for June 1.

CERTAIN activities of the cottonseed industry are in violation of the law, the Trade Commission states in the letter submitting to the Senate its report on the industry. The Commission concludes from its investigation that the trade practice conference rules have been abused. It holds that various divisions of National Cottonseed Products Association added to and subtracted from the rules by adopting so-called "interpretations" which contributed to the effectiveness of its price uniformity plan and constituted restraint of competition.

ICE CREAM bootlegging in New York State has suffered a setback since March 1, when the state's frozen desserts law went into effect. And, what is better, legitimate manufacturers report increased sales of novelty products. Between March 1 and April 21, a total of 899 convictions for violation of the law were obtained.

The constitutionality of the measure was brought to test in a recent case in municipal court, decision being reserved. The case involved prosecution of a Brooklyn dealer for selling from a cabinet of the Reid Ice Cream Corp. frozen desserts manufactured by other concerns. The ice cream industry is much interested in the outcome of this case, since it probably will establish an important precedent. The feeling is that the law will be upheld.

In general, the law provides that frozen desserts of one manufacturer cannot be placed in the cans or cabinets belonging to another manufacturer.

MANUFACTURERS are responsible for many of the wholesalers' troubles, in the opinion of J. H. McLaurin, president of American Wholesale Grocers' Association. In his speech before the opening session of the association in Memphis, on May 9, Mr. McLaurin put the issue of price cutting and uneconomic distribution squarely up to the manufacturers. He condemned the practice of selling the wholesaler and then stocking up the wholesaler's own retail customers. He expressed the opinion that it is due time for the wholesale grocer to attack vigorously these trade evils and to employ his influence to get the manufacturers to state their policies so that the wholesaler may act accordingly. The wholesalers do not complain of the manufacturer who sells direct to retailers and does it openly.

TO AID in bringing about stabilization in the sugar trade in accordance with the farm relief law, Secretary of Agriculture Wallace proposes a "sugar industry council." It is reported that sugar interests will submit to this council a plan for regulating the foreign and domestic quotas. Such a plan is in existence. It provides that domestic beet and cane production, including that of Porto Rico and Hawaii, be maintained on the present basis; that importation of sugar from the Philippines be as established by the Independence Act; and that Cuba's quota be placed at 2,000,000 tons annually.

This plan was first drawn up some time ago, but it has not been accorded a very ready acceptance. Beet sugar producers feel that their annual allotment of 1,100,000

THIS MONTH

JUNE

19-23—National Confectioners' Association, annual meeting and exposition, Hotel Sherman, Chicago, Ill. Frank S. Records, secretary, 111 West Washington St., Chicago, Ill.

19-21—Association of U. S. Flavoring Extract Manufacturers, annual meeting, Chicago, Ill. L. K. Talmadge, secretary, Williams & Carleton Co., Hartford, Conn.

21-23—Mutual Millers and Feed Dealers' Association, Lancaster, Pa.

25-30—Sixth Midwest Engineering and Power Exposition, Stevens Hotel, Chicago, Ill. G. E. Pfisterer, director, 308 West Washington St., Chicago.

26-29—American Dairy Science Association, University of Illinois, Urbana, Ill.

NEXT MONTH

JULY

6—Mid-West Shippers' Advisory Board, quarterly meeting, Palmer House, Chicago, Ill.; also Peoria, Ill. A. W. Wilkins, secretary, 59 East Van Buren St., Chicago, Ill.

12-14—National Confectionery Salesmen's Association of America, annual meeting, Baltimore, Md. Henry K. Michaels, secretary, 282 Northern Ave., New York, N. Y.

tons is too small. Porto Rican producers believe their quota should be 900,000 tons, rather than 800,000 tons, and they would like it to be graduated upward to cover increased consumption. Hawaiian interests also favor a rising scale.

With the government acting as a mediator, some of those differences probably can be smoothed out.

Oleo Tax Unconstitutional

Kentucky's oleomargarine tax has been declared unconstitutional by a federal court. This tax, established in 1932, comprised a 10-cent per pound levy on all types of margarine.

The court action was instigated by Field Packing Co., Kentucky distributor for Best Foods, Inc. Palmer Schade, general sales manager for Best Foods, significantly pointed out that if the Kentucky court holds a tax on margarine unconstitutional, how much more unconstitutional are laws which discriminate in favor of one kind of margarine.

Several states have recently enacted laws which tax only nut margarine, exempting margarine made from certain domestic oils and fats.

New Definitions for Foods

New definitions have been adopted by the Secretary of Agriculture for apple butter and dried apricots, peaches and prunes. And revised definitions have been accepted for oil of lemon, macaroni and noodles.

APPLE BUTTER is defined as the semi-solid product obtained by cooking to a suitable consistency the strained edible portion of apples with sugar and/or dextrose, with or without one or more of the following: apple juice, boiled cider, spice, salt. In its preparation not less than 5 parts by weight of the strained apples are used to each 2 parts by weight of sugar and/or dextrose. The product has a characteristic apple flavor and is commonly spiced.

EVAPORATED APPLES are peeled, cored, and sliced apples from which the greater portion of the moisture has been evaporated. The finished product contains not more than 24 per cent of moisture.

DRIED APRICOTS are halved and pitted ripe apricots from which the greater portion of the moisture has been evaporated. Before packing, the dried fruit is commonly processed by washing. The finished product contains not more than 26 per cent of moisture.

DRIED PEACHES are halved and pitted ripe peaches from which the greater portion of the moisture has been evaporated. The finished product contains not more than 26 per cent of moisture.

DRIED PRUNES are whole, ripe prune plums from which the greater portion of the moisture has been evaporated. The finished product contains, in the fleshy portion, not more than 25 per cent of moisture.

OIL OF LEMON is the volatile oil expressed, without the aid of heat, from the fresh peel of the lemon *(Citrus limonia Osbeck)*, with or without previous separation of the pulp and peel.

MACARONI is the shaped and dried doughs prepared by adding water to one or more of the following: semolina, farina, wheat flour. It may contain added salt. In the finished product the moisture content does not exceed 13 per cent.

EGG NOODLES are the shaped and dried doughs prepared from wheat flour and eggs, with or without water, and with or without salt. The egg ingredient may be whole egg and/or egg yolk. In the finished product the moisture content does not exceed 13 per cent; and the egg content, upon the moisture-free basis, is not less than 5.5 per cent by weight of egg, calculated as whole egg solids. Noodles are commonly ribbon-shaped.

PLAIN NOODLES are the shaped and dried doughs prepared from wheat flour and water, with or without salt. In the finished product the moisture content does not exceed 13 per cent.

"Bleached" Not Needed

Bakers operating in New York City no longer need use the "bleached" label on products baked with bleached flour. The Health Department regulation requiring that was repealed on May 2. This removes from bleached-flour products the adverse pyschological reaction which the label caused in many consumers. And it opens to millers of bleached flour a larger outlet in the world's largest center of food consumption. Bleached packaged flour still must be marked as such.

Pea Sizes; New Standard

The number of sizes of canned peas have been reduced from five to three, being specified simply as small, medium and large. This is in accordance with acceptance by the industry of the simplified practice recommendation (see FOOD INDUSTRIES, April, p. 154).

Federal standards for canned peas also have been revised. An amendment to the Food and Drugs Act was issued May 11, to become effective in 90 days. The revision provides that the pea shall not be considered immature if 25 per cent or more by count are swollen to such an extent as to rupture the skin sufficiently to separate the broken edges $\frac{1}{16}$ in. or more.

Warm Bath Opens Clams

Clams may be opened easily and with no ill effects by a new method announced by the Bureau of Fisheries. The opening is effected by immersion in a warm bath of fresh or sea water at a temperature of 105 deg. F. A temperature fluctuation between 100 and 110 deg. is permissible.

In the Bureau's experiments, 100 per cent of the clams opened their shells in from ten to twenty minutes, and when removed from the bath a few minutes later, were completely narcotized. The immersion method causes no shrinkage or apparent loss of tissue fluids, and the meat is in the same condition as when the clams are opened raw.

The process will be tried out on a commercial scale, and further studies are being made to determine if a similar method can be applied to oysters.

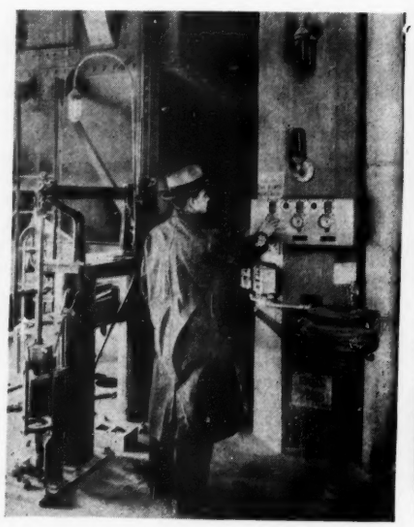
Proposes City Milk Plant

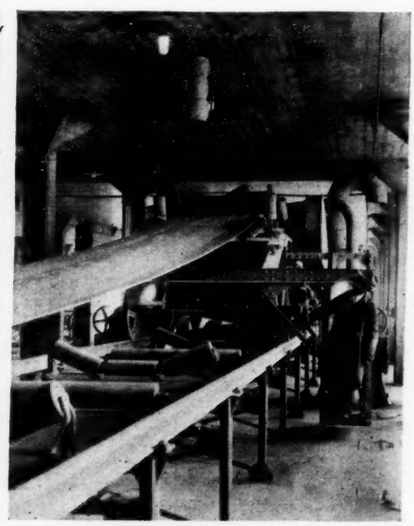
Municipal ownership of the milk plant is the latest proposal for solving the hectic dairy situation. Mayor Samuel A. Carlson of Jamestown, N. Y., has written the Reconstruction Finance Corp., urging that a loan of $250,000 be made to the city to enable it to build its own milk plant. The Mayor in his letter says that a city milk plant would make possible a higher price to the producer and a lower price to the consumer.

Rulings on New York Tax

Mayonnaise is a necessary food product, and the New York State sales tax does not apply to it. This decision by the Tax Commission of New York State reversed a previous ruling. Just before the sales tax became effective on May 1, the Commission held that mayonnaise was not a staple food product and would be subject to the tax. The Mayonnaise Institute made strenuous protest, causing the Commission to reconsider the matter, and the favorable decision resulted. Ice cream served plain also is exempt from the tax, but when covered with syrup it is to be considered a confection and will be taxable.

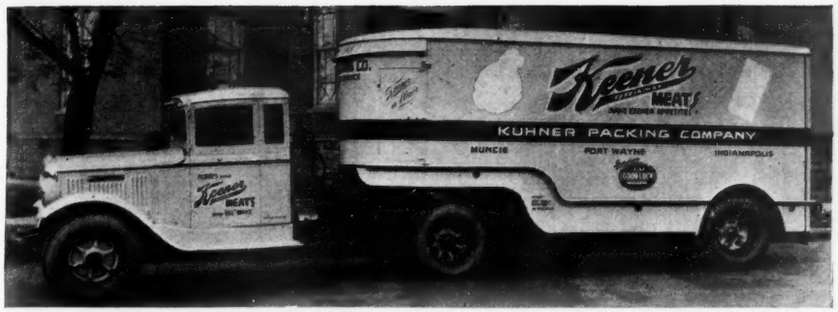
An interpretation issued by the State Tax Commission May 23 states that materials used in the preparation of a taxable product and not entering the product as a resalable part are to be taxed upon their sale to the processor.





Routes Grain by Electric Indicators

At the huge grain elevator of Reading Railroad, Philadelphia, the weighmaster (left) dispatches grain to the proper bin on a belt conveyor, transmitting the bin number to the binman by an electrical indicator system. Overhead indicators along the conveyor (right), as well as an indicator in the binman's office, show the number.



Covers 530-Mile Route

Kuhner Packing Co., Muncie, Ind., distributes meats, margarine and other perishables over a 350-mile route with this new refrigerated semi-trailer. Temperatures between 40 and 45 deg. F. are maintained with water ice.

Foods Are Featured at Fair

Spectators attending the Century of Progress Exposition, which opened in Chicago May 27, will find the "story of foods" one of the most interesting subjects at the great fair. A spectacular attraction will be lectures by a 10-ft. robot on digestion. And of interest to the housewife who likes to know what's back of the food she puts on the table will be the many displays by food manufacturing companies in the Agricultural Building, Dairy Building and the Hall of Science. The exhibitors include General Foods Corp., Standard Brands, Inc., Allied Mills, Inc., National Biscuit Co., Quaker Oats Co., Libby, McNeill & Libby, Kraft-Phenix Cheese Co., Stewart & Ashby Coffee Co., H. J. Heinz Co., National Sugar Refining Co., Hovden & Co., Burpee & Co., Hansen Laboratories, Morton Salt Co., Atlas Brewing Co., W. F. Straub Laboratories, Inc., Durkee Famous Foods, Coca-Cola Co., Fred Amend Candy Co. and Great Atlantic & Pacific Tea Co. A joint meat and livestock exhibit is sponsored by the Department of Agriculture, Institute of American Meat Packers, National Association of Retail Meat Dealers and National Live Stock and Meat Board.

In addition to the food exhibits, there will be many association activities.

Food Associations Honored

For outstanding work during 1932, American Dry Milk Institute, Roud McCann, director, received honorable mention in the presentation of the American Trade Association Executives Award. The institute merited this distinction by the development of new markets for its products through new and extended uses; by the reduction of surplus stock; and by increasing its membership and maintaining all its normal activities in a time of economic stress. Special commendation was made of the work done by Milk Research Council, Inc., Edward F. Brown, executive vice-president, and of that done by Dairy and Ice Cream Manufacturers' Association, C. Earl Breece, secretary.

The award went to Cotton Textile Institute, George A. Sloan, president.

Who Knows the Answer?

From a confectionery manufacturer comes an inquiry as to where and in what form he can obtain an edible material similar to paper in its physical properties. The material should be in sheet form, should bend easily and must conform with federal food regulations. The manufacturer suggests that it should be something similar to fish food.

The confectioner will welcome suggestions. Communicate with him through FOOD INDUSTRIES.

Concentrates

United Prune Growers of California concluded its grower sign-up campaign May 16, obtaining more than the required 80 per cent of control . . . Sauerkraut Exchange of America has been formed in Cleveland; Lon P. Flanigan, Seneca Kraut & Pickling Co., Geneva, N. Y., is president . . . Minnesota members of National Cheese Producers' Federation have formed a new cheese pool similar to that in Wisconsin . . . Senator Capper introduced a bill on May 8 calling for prison sentences or fines for fraudulent or misleading advertising . . . Beer is now legal in 30 states . . . Experiments at New York State Experiment Station prove that peas from diseased vines usually are larger than those from healthy vines of the same age . . . Ultra-violet irradiation imparts anti-rachitic properties to soda crackers, when done immediately after baking . . . Minneapolis is one of the first cities to recognize officially vitamin D milk . . . Forty-five dairies and bakeries with plants in 75 cities are using the Zucker-Columbia University vitamin D process . . . Butter sold in Cincinnati must come from tuberculin-tested cows in accredited areas and must be so labeled, recent regulations require . . . Amendment to the agricultural and markets law in New York State, effective May 1, omits ice milk from list of legal frozen desserts and lowers maximum milk solids content of milk sherbet from 8 to 5 per cent by weight . . . Simplification recommendations for glass containers for cottage cheese and sour cream virtually have been adopted . . . Simplification schedule for ice cream brick molds and cartons has been reaffirmed without change . . . Prune crush is a new ice cream flavor introduced into the West by California Fruit Crush Co. . . . The pimiento pepper is richer in vitamin A than butter, carrots and spinach, according to Dr. Leah Ascham, Georgia Experiment Station . . . In flooring tests by B. F. Goodrich Co., concrete was badly damaged in 44 minutes by a metal wheel, while a rubber-tired wheel had no effect in 46 hours . . . Germany raised tariff on lard and similar fats from 50 to 75 reichsmarks per 100 kilos, effective May 16; it was increased recently from 10 to 50 reichsmarks.

WHAT'S ON YOUR MIND?

Final Curtain on the Cocoa-Milk Case?

To the Editor of FOOD INDUSTRIES:

Confirming our telephone conversation with you this afternoon, I inclose a copy of the decision rendered on May 18, 1933, by Judge Coleman, of the U. S. District Court for the Southern District of New York, in re: Krem-Ko Co. v. Heyman Process Corp., of New York.

You will recall that in the summer of 1932, FOOD INDUSTRIES published an article by Herbert B. Larner and that subsequently the accuracy of some of the statements made by Larner were disputed by the firm of Wilkinson, Huxley, Byron & Knight, attorneys for Krem-Ko Co., of Chicago, Ill., the plaintiff in the above entitled case.

The objections and criticisms voiced by these attorneys were published in a later edition of your publication. I refer particularly to a letter dated July 7, 1932, signed by Wilkinson, Huxley, Byron & Knight, addressed to the McGraw-Hill Publishing Co., Inc., which I believe appeared in the August number of your publication.

It develops, however, that Larner was right in the statements made in his article and that the attorneys for the Krem-Ko Co. were wrong. I hope therefore, that in view of the publication of the letter of Wilkinson, Huxley, Byron & Knight, you will give the winning of this suit by the Heyman Process Corp. as much publicity as possible. Perhaps you would like to reproduce this letter.

Heyman Process Corp. won a complete victory against its competitor. The court not only invalidated the claims of the North patents sued upon but also held that the Heyman Process Corp. had acted in a perfectly lawful manner in advertising its "commercially new chocolate milk mixture."

As a result of this judicial determination, Heyman Process Corp. has a perfect right to manufacture and sell non-settling chocolate milk beverage products in any form it may desire to market them.

CHARLES H. WILSON.
Attorney.

511 Fifth Ave.
New York, N. Y., May 22, 1933.

MEN, JOBS AND COMPANIES

INDUSTRY

ASSOCIATED BREWERY OF CANADA, LTD., a $5,000,000 corporation, plans to operate the Imperial Beverage Co. plant at Spokane, Wash. Brewing was to have been started early in May.

ASSOCIATED GROWERS OF BRITISH COLUMBIA, LTD., has closed a contract with Duthie & Co., Inc., Portland, Ore., Pacific Coast representative of Fruit and Produce Exchange of Great Britain, covering the entire tonnage of the association's export apples for shipment to the United Kingdom during the season of 1933-34.

BAHAMA ISLES FOODS CORP., New York, recently organized to manufacture food products from the Bahama conch, has acquired 51 per cent interest in Smithfield Ham & Products Co., Inc., Smithfield, Va. E. E. Taylor, president of the Bahama company, is also president of Smithfield.

BORDEN CO. has consolidated twelve subsidiary ice cream and dairy firms in Ohio and Indiana. The combine includes Moores & Ross, Inc., Furnas Ice Cream Co., Hamilton Milk Co. and their branches. Operations will be centralized in Borden's Dairy & Ice Cream Co., Inc., newly organized corporation. S. M. Ross, Columbus, will be president of the new organization.

BRUCKMAN CO., Cincinnati brewers, plan to buy the plant and equipment of Cincinnati Beverage & Products Co., formerly near-beer manufacturers.

CANADA DRY GINGER ALE, INC., has become national distributor for the original Czechoslovakian Pilsen, representing Pilsen Breweries, Ltd.

CARSTENS PACKING CO., Tacoma, Wash., announces a line of tinned meat specialties and accessory meat dishes.

CHASE & SANBORN, New York, has experienced such a rapid increase in its tea-ball business that new equipment has been added to the Boston plant five times in three years. A new $12,000 packing machine is now being installed.

CINCINNATI WHOLESALE GROCERY CO., packer of White Villa foods, including 135 items, has changed its name to White Villa Grocers, Inc.

DAIRYMEN'S LEAGUE COOPERATIVE ASSOCIATION, INC., New York, is permitting its trade name, "Dairylea," to be displayed on the front of a New York chain of sandwich and doughnut shops which use Dairylea dairy products exclusively.

EAGLE NUT PRODUCTS, INC., Brooklyn, N. Y., has moved into larger quarters and spent about $20,000 for machinery and equipment. In addition to nuts, the company will manufacture miniature chocolates, 100 different candy centers, 5-cent bars and boats and a general 5-lb. bulk line.

GENERAL BAKING CO., New York, reduced its accident frequency rate by 20 per cent in 1932.

HERMAN FALTER PACKING CO., Columbus, Ohio, is spending more than $25,000 to enlarge its plants and provide for beef and veal departments.

HORTON PILSENER BREWERY, New York, recently spent $350,000 in modernizing the Bernheimer & Schwartz Brewing Co. plant. Ralph H. Horton is president. This company is not connected with J. M. Horton Ice Cream Co., Inc.

LIEBMANN BREWERIES, Brooklyn, N. Y., has contracted for twelve glass-lined tanks having a combined capacity of nearly 15,000 bbl., according to Pfaudler Co.

NATIONAL SUGAR REFINING CO., is experimenting with the manufacture of raw sugar from imported "molasses" at its Yonkers (N. Y.) plant.

PACIFIC AMERICAN FISHERIES has leased the properties of Northwestern Fisheries, in Alaska, adding eleven canneries to its holdings. This makes the company the world's largest salmon canning corporation, the new plants adding 50 per cent to its capacity, it is reported.

PHILLIPS PACKING CO., Cambridge, Md., is making an intensive advertising drive in several cities, especially Philadelphia. The company has added asparagus soup to its line.

PRIVATE BRANDS, INC., was recently organized in New York with Albert Muscher, head of Mayonnaise Service Corp., Baltimore, as president. It was felt that Mayonnaise Service Corp., subsidiary of Van Camp Packing Co., Indianapolis, was being injured by the Van Camp receivership. Private Brands will receive its products from General Mayonnaise Corp., Jersey City, N. J.

SCHMIDT BREWING CO., Los Angeles, will build a 100,000-bbl. plant at a cost of $400,000 equipped. The Schmidts are among former big brewing interests who are coming back into the business. They will build plants at Olympia, Wash.; Salem, Ore., and Los Angeles. Frederick W. Schmidt is president.

STANTON PICKLE CO.'S plant, Anaheim, Calif., was completely destroyed by fire recently.

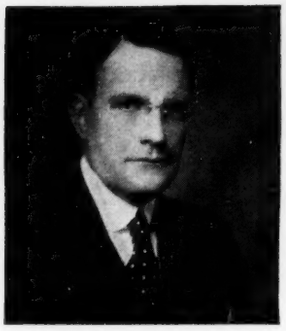
WILLIAM SIMON BREWERY, Buffalo, N. Y., which formerly produced 82,000 bbl. of beer annually, will resume operations in the near future. William J. Simon is president.

WILLIAM S. SOULL CO., sponsor of Bosco, a food drink with a chocolate malt flavor, announces the product is now being distributed on a nation-wide basis. It was introduced along the Atlantic seaboard only a few years ago.

SOUTHERN DAIRIES, INC., is using "Mickey Mouse" to promote the sale of its dairy products. A new frozen delicacy, "Mickey Mouse Ice Cream in-a-Cup" is decorated with drawings by Walt Disney.

SUN-MAID RAISIN GROWERS OF CALIFORNIA will not be able to use "Sun-Maid" as the trademark on foods other than raisins and raisin products, according to a decision by the U. S. Court of Customs and Patent Appeals.

TOVREA PACKING CO., Phoenix, Ariz., has purchased National Packing Co.'s Vernon district plant, Los Angeles, for $100,000.



ROBERT F. MILLER
Resigns as vice-president of A.G.M.A.

PERSONNEL

L. A. BLETZER has been chosen president of Ohio Association of Ice Cream Manufacturers. F. M. CAMPBELL is vice-president; R. A. LAMONT, treasurer.

J. MILTON CORK, director of merchandising for Loblaw Groceterias Co., Ltd., Toronto, has been named president of the company to fill the vacancy created by the death of T. P. Loblaw. Mr. Cork has been in charge of merchandising since the company was formed in 1919.

THOMAS D. CUTLER, publisher of *The Ice Cream Trade Journal*, has resigned as treasurer and director of Dairy & Ice Cream Machinery & Supplies Association. He had been treasurer of the association and of its predecessor, the Association of Ice Cream Supply Men, for fourteen years. John H. Mulholland, president of the company bearing his name, succeeds Mr. Cutler as treasurer.

HARRY DENNERT, Newport, Ky., and JOSEPH RUH, formerly brewmaster of Bavarian Brewing Co., Covington, Ky., have formed the Old Munich Brewing Co. to operate that part of the Moerlein Brewery Co., Cincinnati, formerly used as a brewhouse. New vats and machinery will cost about $200,000.

S. B. EPLER, Toledo, was elected president of Ohio Association of Creamery Owners and Managers. F. C. WRIGHT, Cincinnati, was named vice-president; L. L. MONTEI, Columbus, treasurer.

JACOB FRANK, of Frank Tea & Spice Co., was reelected chairman of the executive committee of American Spice Trade Association at its recent New York meeting. Other members reelected to the committee include M. P. Hermann, Durkee Famous Foods, Elmhurst, N. Y.; F. H. Long, McCormick & Co., Baltimore; Charles A. Thayer, R. T. French Co., Rochester; and James S. Murphy, Stickney & Poor Spice Co., Boston.

FRANK A. GODCHAUX, SR., has been reelected president of Louisiana State Rice Milling Co., Inc., Abbeville, La. Other officers elected were W. H. Hunter, J. F. Faber and Frank A. Codchaux, Jr., vice-

GEORGE H. WILLCOCKSON
Loose-Wiles vice-president succumbs

presidents; C. N. Howard, secretary-treasurer; H. H. Scroggin, cashier. The company reports a 25-per cent increase in its annual distribution, having the largest volume in fifteen years.

EARL GOELZER was recently chosen president of Plymouth Packing Co., Plymouth, Wis. O. A. Blackburn, of Kraft-Phenix, was made secretary-treasurer. J. L. Kraft is chairman of the board.

JULIUS GOLMAN, Golman Baking Co., Dallas, became president of Texas Bakers' Association at the organization's recent annual convention in Dallas.

C. E. GRAY, Golden States Co., San Francisco, has been reelected chairman of the executive committee of American Dry Milk Institute. Other members of the committee include Walter Page, Borden Co., New York, vice-chairman; H. E. Van Norman, president; M. J. Metzger, Bowman Co., Chicago, treasurer; R. R. Gockley, H. R. Leonard and F. A. Wills.

R. I. HALCRO, a produce buyer for Kroger Grocery & Baking Co., has been transferred from the Indianapolis branch to Toledo.

WILLIAM P. HARTMAN, for more than eight years a director and general superintendent of W. R. Roach & Co., Grand Rapids, Mich., packers of Hart brand canned foods, is now general sales manager of the company.

JOSEPH S. HICKS, formerly assistant director of research, Hecker H-O Co., Buffalo, has joined Crowell & Murray, Inc., analytical and consulting chemists, Cleveland. Mr. Hicks developed cereal products for Hecker.

C. R. HOLTON, a personnel manager for Kroger Grocery & Baking Co., was recently moved from Indianapolis to St. Louis.

EDWARD M. JOY, Purity Bakery, Inc., Providence, R. I., has been elected first vice-president of American Society of Bakery Engineers.

JOHN A. MCCARTHY recently was named president of Pennsylvania Sugar Co. Other officers elected include WILLIAM H. HOODLESS, vice-president and general manager; LOUIS J. KOLB, SAMUEL F. HOUSTON and GEORGE H. EARLE, 3d, vice-presidents; HENRY H. JONES, secretary and treasurer.

H. L. MILLER, formerly manager of the Chicago bakeries of National Biscuit Co., is now assistant manager of production, with headquarters at New York.

ROBERT F. MILLER resigned as executive vice-president of Associated Grocery Manufacturers of America May 1 to become president of United States Travel Association, Chicago. Mr. Miller had completed four years of service with A.G.M.A.

HANS C. OKSEN recently became connected with Central Sugar Co., Decatur, Ind., as superintendent. Mr. Oksen was chief engineer of Great Lakes Sugar Co., Blissfield, Mich., in 1932, and had previously served Holland-St. Louis Sugar Co., Decatur, and Continental Sugar Co., Findlay, Ohio, as chief engineer.

HARVEY OWENS, formerly with National Biscuit Co., is now president of Grennan Bakeries, Chicago, cake subsidiary of Purity Bakeries.

SHELDON PERHAM recently became president of Borden California Co., succeeding the late Edward Bahue.

H. L. PORRIGO, president of Victor Flour Mills, Inc., Pittsford, N. Y., was elected president of New York State Millers' Association, May 11. J. W. WARD, president of William Hamilton & Sons, Caledonia, was chosen vice-president.

WILLIAM ROEGGE, president of Lippincott Co., with plants in Cincinnati and Louisiana, announced the middle of May that a heavy demand had exhausted the pack of tomato products of his company for the first time in five years.

F. MORRIS SAYRE, J. D. BUHRER and C. L. CAMPBELL were recently elected vice-presidents of Corn Products Refining Co., New York. Mr. Sayre is in charge of manufacturing; Mr. Campbell, purchases; Mr. Buhrer, package sales.

JOHN C. SCHERER has been appointed Chicago manager of Beech-Nut Packing Co. to succeed Charles Jones, resigned. He has been with the company 20 years.

PAUL L. SCHWARTZ has been appointed general sales manager of Duval's Food Products Co., New York, manufacturer of an ice cream mix and a chocolate flavored syrup in powdered form.

ANDREW TEHEL has resigned as superintendent of the hard candy department of E. J. Brach & Son, Chicago, to join Metro Chocolate Co., Brooklyn, N. Y.

T. C. THATCHER was elected director of Red Star Milling Co., to fill the vacancy created by the death of Roger S. Hurd. J. L. WALKER, vice-president of the company, became general manager, also.

GEORGE C. THIERBACH, of Jones, Thierbach, San Francisco, was elected president of Pacific Coast Coffee Association May 20.

DEATHS

GEORGE LESTER BALL, 42-year-old vice-president of Independent Salt Co., New York, was killed May 15 when he fell or jumped from the ninth floor of a private hospital.

GEORGE R. DEFALCO, a Baltimore oyster and fruit packer for more than half a century, died May 2 at the age of 79.

GUY S. JENKINS, 56, manager of coating sales for Lamont, Corliss & Co., New York, sales agents for Peter's and Nestlé's chocolate products, died May 4.

FREDERICK S. JUDD, manager of Swift & Co.'s plant in New Haven, Conn., for many years, died May 7 at the age of 59.

FRANK M. LONG, production manager of Affiliated Borden Companies, in charge of ice cream and milk operations for the company in Ohio, Indiana and Missouri, was drowned in Olentangy River, in Ohio, May 13 when his canoe capsized.

WILMOT L. MATTHEWS, president and general manager of Canada Malting Co., Ltd., Toronto, died May 3 in Bermuda. He was 55.

E. T. RECTOR, 62-year-old president of Fairmont Creamery Co., died recently in Chicago. He had been at the head of the Fairmont company for several years.

JOHN T. RUSSELL, 72, former president of the Meat Council of Chicago and former national president of United Master Butchers' Association, died May 19. Mr. Russell retired three years ago as head of Russell Packing Co.

CONRAD J. SCHENKEL, who had been connected with the H. F. Hemingway & Co., Baltimore, for 50 years, died May 1 at the age of 71. He was vice-president and general manager of the company. Mr. Schenkel had of late lent a guiding hand in the business of his son, R. D. Schenkel, who operates Greencastle (Pa.) Packing Co.

EZRA JOSEPH WARNER, president and treasurer of Sprague, Warner & Co., Chicago, died May 9 at the age of 56. He was the son of Ezra J. Warner, one of the cofounders of the wholesale grocery house.

GEORGE H. WILLCOCKSON, vice-president and a director of Loose-Wiles Biscuit Co., Long Island City, N. Y., died May 2, of acute indigestion. He was 57. Mr. Willcockson first became connected with the biscuit business in 1896 when he was employed by American Biscuit & Manufacturing Co., St. Paul. In 1909, he began his long association with Loose-Wiles Biscuit Co., at the Boston bakery.

ASSOCIATED INDUSTRIES

ACME STEEL CO., Chicago, has introduced a new advertising campaign centered about "Doc. Steelstrap" an amiable looking human likeness made of coiled steelstrap.

ALUMINUM COOKING UTENSIL CO., New Kensington, Pa., announces the election of W. C. White as president and a director of the company.

AMERICAN DRYICE CORP. has taken over the business of DryIce Corp of America, establishing executive offices at 205 East 42d St., New York, N. Y.

BATAVIA BODY CO., Batavia, Ill., built a mechanically equipped ice cream truck body which will be part of the General Motors exhibit at the World's Fair.

B. F. GOODRICH RUBBER CO., Akron, Ohio, announces reinstatement of its Bock brand brewers' hose.

NATIONAL ENAMELING & STAMPING CO., Granite City, Ill., will begin the production of steel beer kegs.

WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J., and Gamon Meter Co. have consolidated their operations in the manufacture and sale of meters. A new company, Worthington-Gamon Meter Co., has been organized.

BUSINESS TRENDS

Food Companies Boost Pay And Add Employees

Food companies are assisting President Roosevelt in his drive for industrial recovery. Planters Nut & Chocolate Co., Suffolk, Va., increased the wages of its more than 700 employees by 20 per cent, effective May 11. Another Southern company, Columbian Peanut Co., Norfolk, Va., has given a 10 to 20 per cent wage increase to its 2,000 employees. This company operates 26 mills in five states.

Apte Bros. Canning Co., Rivera, Fla., reports a blanket wage increase of 6 per cent. They have also taken on employees during the last month. The company will operate seven canning plants this year in Florida, Georgia, South Carolina and Delaware.

Independent bakers in Cleveland have agreed to raise the price of bread 1 cent and decrease hours of employment without cutting wages, and take on more help. To do its bit toward recovery Ward Baking Co. will demolish its Providence (R. I.) plant and rebuild and reequip it. All but one wing will be wrecked.

Hop prices have sky rocketed with the return of beer, and so have the wages of the hop-yard employees of Oregon Breweries & Hop Farms, Inc., Portland. Ore. Wage increases from 10 to 20 per cent were announced.

Arthur P. Williams, president of R. C. Williams & Co., Inc., New York wholesalers, recently advised President Roosevelt by telegram that this company was increasing all salaries 5 per cent.

BASIS FOR THE CURVES

Retail food prices, factory employment, factory payrolls and wholesale prices are based on indexes of the Department of Labor. Cost-of-living index is that of the National Industrial Conference Board. Electrical power consumption figures are furnished by *Electrical World*.

Prices Soften

- After an almost continuous climb since April 1, commodity prices have begun to waver. This weakening is largely the result of lower demand due to higher prices, warmer weather with improved crop conditions, and profit taking. Price fluctuations are likely to persist for a while in most food materials, especially if moderately warm weather continues.
- Average wholesale price of all commodities reported by the U. S. Department of Labor rose 3.14 per cent during the three-week period ending May 13. In the same period farm products and foods advanced 9.87 and 5.16 per cent, respectively. The *Journal of Commerce* weighted index of prices during the three weeks ending May 20 shows net increases of 2.43 per cent for all commodities, 3.72 per cent for grain, and 3.78 per cent for foods. Appreciable decreases in all three groups took place during week ending May 20.
- Business indications point to continued improved conditions and renewed activities. *The Business Week Index* of general business has risen continuously for nine weeks, passed the 1932 level, and stands at 59.0 per cent of normal for the week ending May 20.
- A. & P. tonnage sales for April fell 18.09 per cent below those for the five weeks ending April 1 and 4.03 per cent below those for April, 1932. General Foods Corp. and H. J. Heinz Co. report marked increase in tonnage sales in May.

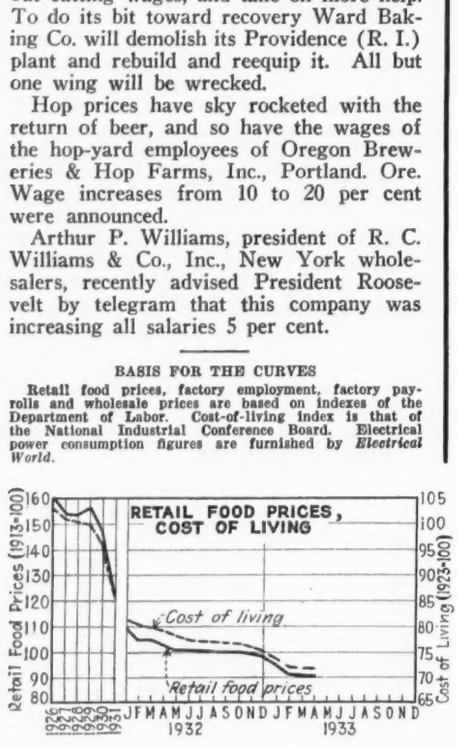
Beer Aids Foods in General; Early Trends Continue

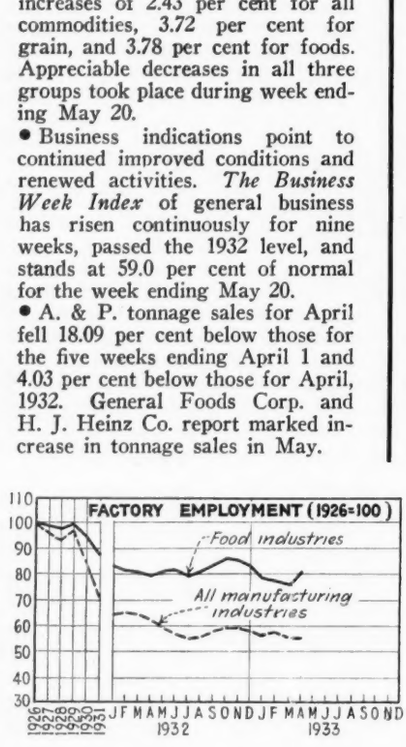
In the two months that beer has been sold outside of the speakeasy, the sales of food in general have increased, a survey by FOOD INDUSTRIES indicates. The reporting manufacturers and wholesalers place the increase at anywhere from "slight" to as much as 15 per cent. But whether this increase in sales is attributable to beer or to general improvement in business conditions is a question. It seems that both are responsible.

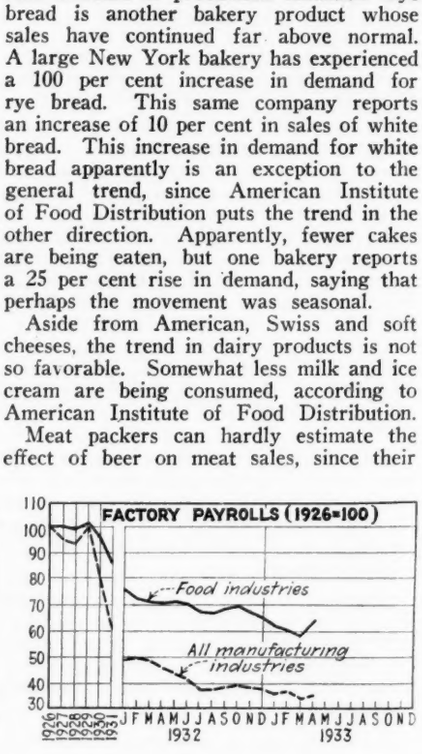
However, there is no doubt that beer has increased the sale of those products which are consumed with it. Pretzel sales still remain double what they were before April 7, and the demand for cheese crackers is quite heavy. Many pretzel plants are being overhauled to increase their capacity, one Chicago concern reporting a 300-per cent increase in production facilities. Rye bread is another bakery product whose sales have continued far above normal. A large New York bakery has experienced a 100 per cent increase in demand for rye bread. This same company reports an increase of 10 per cent in sales of white bread. This increase in demand for white bread apparently is an exception to the general trend, since American Institute of Food Distribution puts the trend in the other direction. Apparently, fewer cakes are being eaten, but one bakery reports a 25 per cent rise in demand, saying that perhaps the movement was seasonal.

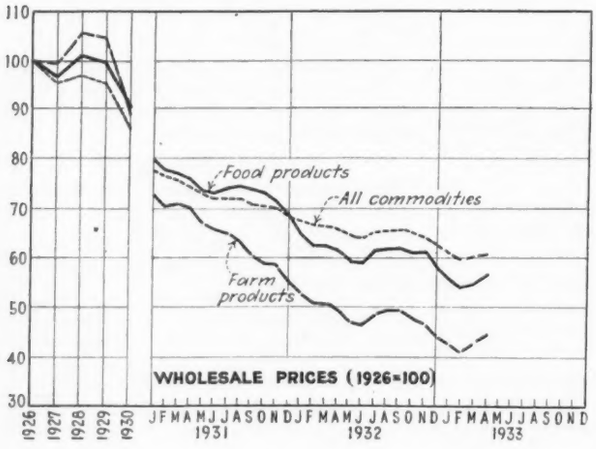
Aside from American, Swiss and soft cheeses, the trend in dairy products is not so favorable. Somewhat less milk and ice cream are being consumed, according to American Institute of Food Distribution.

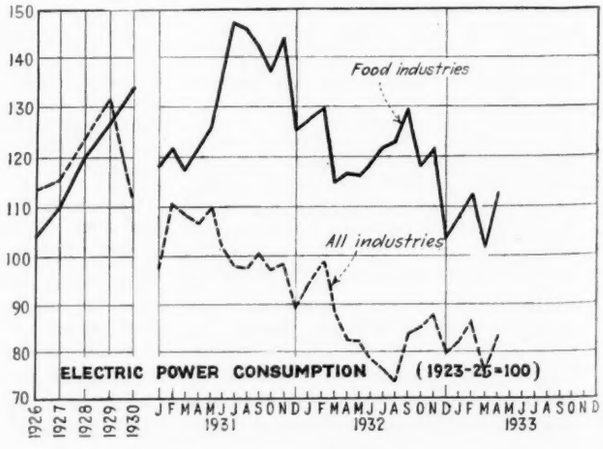
Meat packers can hardly estimate the effect of beer on meat sales, since their


RETAIL FOOD PRICES, COST OF LIVING
Retail Food Prices (1913=100)
Cost of Living (1923=100)
Cost of living
Retail food prices
1926 1927 1928 1929 1930 1931
J F M A M J J A S O N D J F M A M J J A S O N D
1932
1933


FACTORY EMPLOYMENT (1926=100)
Food industries
All manufacturing industries
1926 1927 1928 1929 1930 1931
J F M A M J J A S O N D J F M A M J J A S O N D
1932
1933


FACTORY PAYROLLS (1926=100)
Food industries
All manufacturing industries
1926 1927 1928 1929 1930 1931
J F M A M J J A S O N D J F M A M J J A S O N D
1932
1933


Food products
All commodities
Farm products
WHOLESALE PRICES (1926=100)
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932
1933


Food industries
All industries
ELECTRIC POWER CONSUMPTION (1923-25=100)
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932
1933

products move at a price, and prices have been up. The consumption of pickled pork products and of cured sausage products, contrary to expectations, are reported to be down by American Institute of Food Distribution. The same source places the sales of carbonated beverages in the "down" class and coffee in "unchanged."

The Pickle Packers' Association states that beer has boosted the price of pickles and that a crop of 4,000,000 bu. is expected next year.

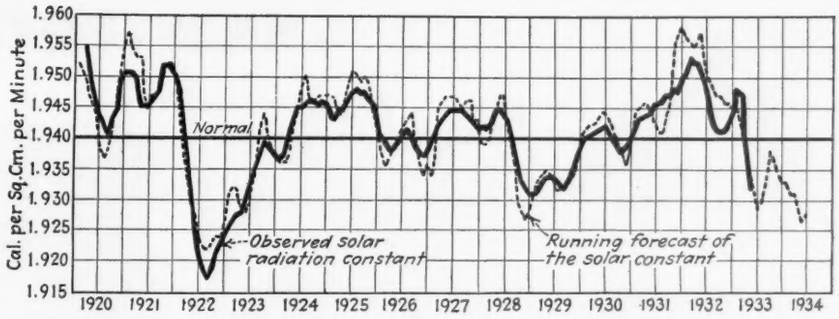
Regardless of whether the public is eating more of their products, most food manufacturers have benefited financially by the return of beer. Collections have increased, because in some cases retail distributors handling beer now have money to pay their back bills.

Regarding the consumption of beer itself, the Internal Revenue Department figures indicate that 1,653,810 bbl. of beer were produced in the United States in April. Considering that the capacity of the breweries ranged between 60 and 80 million barrels annually before prohibition, it is obvious that much expansion remains to be done in the brewing industry.

The trends in food sales have varied considerably in different localities, being determined largely by the tastes of the people of the community for beer and the foods that are eaten with it.

Ship Philippine Pineapples

Pineapples from the Philippines are arriving in Portland, Ore., in increasingly large quantities. This fruit, described as being larger, more symmetrical and more delicious than any other variety, met such a demand on the first shipment, in February, that larger shipments are being made. Importation of the Philippine pineapples probably will be pushed by the shipping lines, since the boats that carry Oregon fruits to the islands need a return cargo.



Solar Radiation Continues Downward

A further anticipated decline in the solar radiation constant occurred in April with the average value for the month standing at 1.932 calories per square centimeter per minute. The accuracy of the forecast has proved to be better than one would normally expect. Incomplete reports for May show a very considerable deviation from the forecast during the first 20 days.

Farming operations have been delayed by rain and cold weather until they are about three weeks late in many states, although in several other localities the season apparently is on schedule.

The mean value of the solar radiation constant is 1.940 calories per square centimeter per minute. The following monthly means have ben reported by the Smithsonian Institution:

July, 1932	1.945	Dec., 1932	1.945
Aug., 1932	1.944	Jan., 1933	1.948
Sept., 1932	1.937	Feb. 1933	1.947
Oct., 1932	1.940	March 1933	1.940
Nov., 1932	1.940	April, 1933	1.932

Bread Prices Will Rise

Inflation talk and prospects of a poor crop in the Southwest have contributed to a steady advance in the price of wheat and wheat products and have definitely stopped talk of the 5-cent load of bread. The price rise, together with processing tax to be levied to aid the farmer point to a 10-cent price level for bread by the end of this year. If a tax of $1 a barrel is levied on the processor that alone would lift the price of bread per loaf out of the 5-cent class. If the tax is $2 or $3 a barrel and if the price of flour rises appreciably, 12-cent loaves probably will be the result.

Indicators

THE PRICE LEVEL of general merchandise and commodities will increase fully 20 and possibly 25 per cent over current levels before the end of 1933, according to an analysis of business conditions by E. B. Moran, National Association of Credit Men.

CUBAN IMPORTS of evaporated milk during the three months ending March 31 totaled only 19,120 cases, representing a drop of 72 per cent compared with 1932. The United States furnished only 930 cases, the Department of Commerce reports. Larger local output is the cause.

THE ACTUAL overproduction of wheat is comparatively small, but the wheat crisis takes the form of an accumulation of exportable stocks, concentrated mainly in United States and Canada, according to the Overseas Wheat Committee, which met in Geneva during May.

PUGET SOUND packers plan to pack both red and pink salmon on a large scale, according to Victor Elfendahl, vice-president of Alaska Pacific Salmon Corp. . . . The demand for canned salmon during March and April was heavier than normal, according to Oceanic Sales Co., Seattle . . . Steelheads from the Columbia River are experiencing a big demand in France . . . Cold-storage holdings of fish on April 15 amounted to only 19,235,782 lb., as compared with 25,915,639 lb. a year ago.

NET PROFITS of bakeries declined from $53,387,984 in 1929 to $27,979,283 in 1932; those of beverage and confectionery concerns from $44,330,571 to $26,974,751; of meat packers, from $30,517,014 to a loss of $9,207,868; of sugar companies from $18,786,630 to $6,378,450. Total for food products manufactures declined from $134,714,207 to $55,978,656; for wholesale and retail food establishments, from $53,659,864 to $36,714,704. Figures are from Ernst & Ernst.

LAMBORNS RECORD OF WORLD SUGAR PRODUCTION AND CONSUMPTION 1922-23 TO 1932-33

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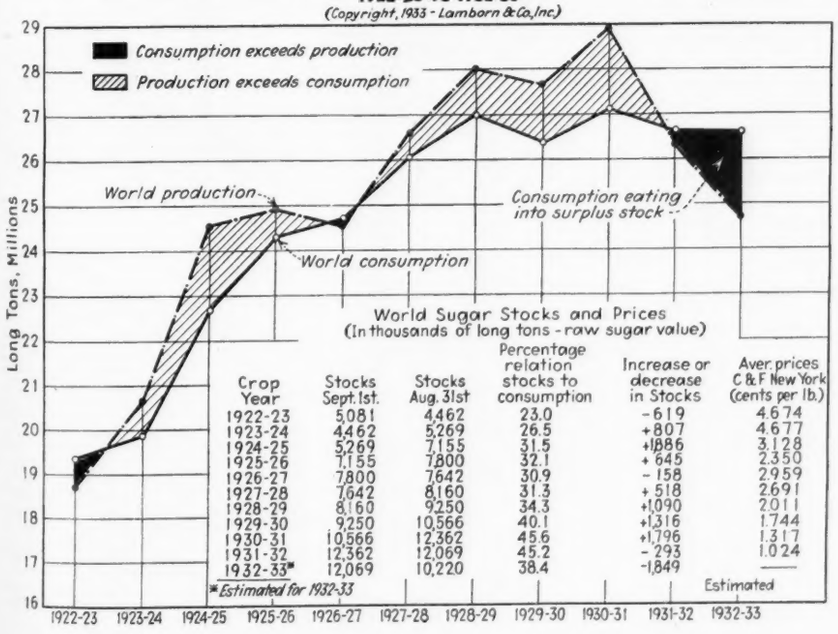
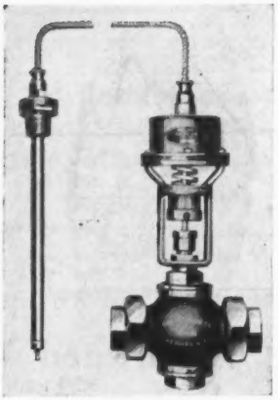


World Sugar Stocks and Prices
(In thousands of long tons - raw sugar value)

Crop Year	Stocks Sept. 1st.	Stocks Aug. 31st	Percentage relation stocks to consumption	Increase or decrease in Stocks	Aver. prices C & F New York (cents per lb.)
1922-23	5,081	4,462	23.0	-619	4.674
1923-24	4,462	5,269	26.5	+807	4.677
1924-25	5,269	7,155	31.5	+1,886	3.128
1925-26	7,155	7,800	32.1	+645	2.350
1926-27	7,800	7,642	30.9	-158	2.959
1927-28	7,642	8,160	31.3	+518	2.691
1928-29	8,160	9,250	34.3	+1,090	2.011
1929-30	9,250	10,566	40.1	+1,316	1.744
1930-31	10,566	12,362	45.6	+1,796	1.317
1931-32	12,362	12,069	45.2	-293	1.024
1932-33*	12,069	10,220	38.4	-1,849	

*Estimated for 1932-33 — Estimated

NEW EQUIPMENT FOR

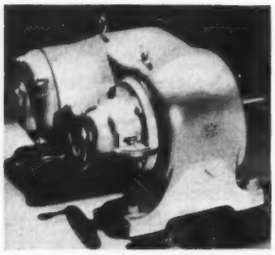


Temperature Control For Liquids

Regulators consisting of a pressure generating bulb, a bellows type actuating element and a valve have been developed by Atlas Valve Co., Newark, N. J., to control the temperature of liquids. The generating bulb contains a thermostatic liquid which gives off vapors as it absorbs heat from the controlled liquid. The pressure set up by the vapor is transmitted by capillary tubing to the bellows unit, which expands and operates the valve that regulates the admission of the steam or gas used to generate the heat. The bellows is of one-piece construction, formed from seamless bronze tubing. Different types of control valves are available.

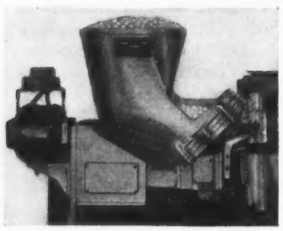
Easy-Open Jars

Stoneware jars with a spring locking, airtight closure are announced by U. S. Stoneware Co., 50 Church St., New York, N. Y. The closure, known as Loxeal, consists of a cap with a compression spring in the center and a metal locking arm that pivots on the spring. The cap is removed by depressing the locking arm and turning it until it disengages with the rim. These containers are white inside and finished with a brown glaze outside. The stoneware is non-absorbent and incorrodible. The jars are made in capacities ranging from ½ to 6 gal.



Variable-Speed Drive

Speed variations as small as 1 r.p.m. are provided by the Varidrive manufactured by U. S. Electrical Manufacturing Co., Los Angeles, Calif., according to the manufacturer. The unit comprises a motor and a set of adjustable V-shaped pulleys connected by a belt. A handwheel or pushbutton control regulates the distance between the two sections of the driven pulley. The other pulley, which is on the end of the motor shaft, expands or contracts reciprocally, expansion being effected by the pull of the belt and contraction by a compression spring on the end of the shaft. The machine is made with variable speed combinations from 25 to 10,000 r.p.m. Standard models give a maximum-minimum speed ratio of 2½ or 3 to 1; a ratio as high as 5 to 1 is possible with special models.

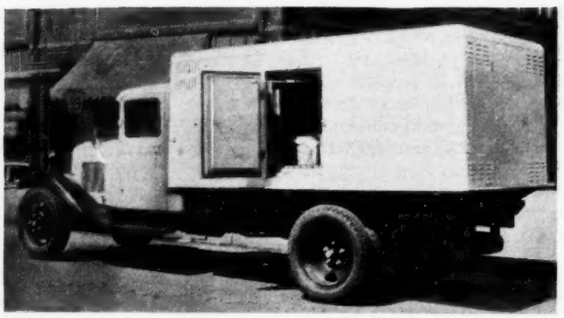


Machine Deposits Salt Tablets

"No can, no tablet" is the control formula of the electrically operated high-speed salt tablet depositor announced by Scientific Tablet Co., 2628 West Main St., Belleville, Ill. This machine does not deposit the tablet until a can has made contact with the operating lever. It may be installed at any point where the cans have a straight-line flow of 2 ft. or more. In operation, a controlled quantity of tablets from the hopper are spread across the slanting face of a tablet-selecting disk which carries one tablet at a time to the ejecting chamber. The machine is driven by a 1/30-hp. motor. A wide variety of other types are available.

Coal-Tar Paints For Industry

Coal-tar paints that are resistant to acids, alkalis, moisture and other corrosive influences have been developed by Quigley Co., Inc., 56 West 45th St., New York, N. Y. These paints penetrate pits and pores readily and may be applied over completely oxidized painted surfaces or over damp surfaces. They dry by evaporation, and are held to retain their protective qualities for a long period. They are neither acid nor basic, and will not react with metals, concrete or other materials. Being elastic to a certain degree, they will withstand temperature changes, vibration and reasonable bending movement. They are said also to be highly adhesive and to possess unusual hiding power. These "Triple A" paints may be obtained in black, with an aluminum vehicle, in plastic form and in colors. The aluminum paint produces a decorative surface with high light-reflecting power. The plastic paint is made by mixing the black with asbestos fiber. The No. 111 dielectric black is used for general protective purposes where foodstuffs are handled. The No. 20 railroad black resists abrasion, sulphurous acid fumes, brine and moisture.

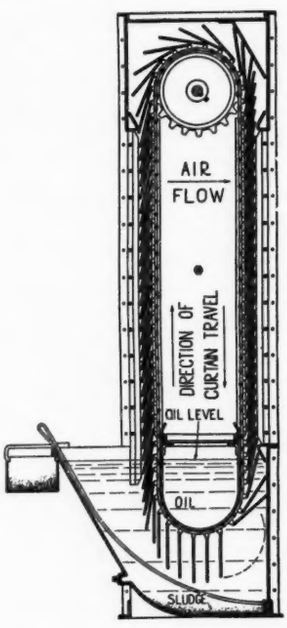


G.E. Equips Truck

Thermostatically controlled refrigeration maintaining a temperature of 0 to 8 deg. F. is provided in a new truck body equipped by General Electric Co., Schenectady, N. Y. The refrigerating system consists of an alternating-current, motor-driven refrigerating unit which receives power while on the road from a generator driven from a transmission power take-off. When not on the road, the system may be driven from a 60-cycle, 220-volt single-phase power circuit. The truck body sets on a 1½-ton chassis and provides space for a total bulk capacity of 315 gal. of ice cream. The body is of all-metal construction with an inner frame of wood. It weighs 2,700 lb.

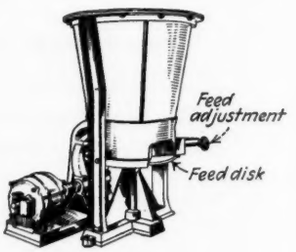
Self-Cleaning Filter

No filtering medium needs to be replaced or cleaned in the aluminum curtain-type air filter announced by Independent Air Filter Co., 29 South Clinton St., Chicago, Ill. This filter is essentially a vertical endless belt of louver plates which is immersed in a tank of oil at the lower extremity. Air passing through the filter is deflected repeatedly at acute angles against oil-coated surfaces of broad metal fins, dust particles being deposited in the viscous film of oil on the fin. Automatic immersion of the filter plates in the oil bath releases dust particles and allows them to settle to the bottom of the oil tank. The filter curtain does not require constant turning, 30 in. of travel once a day ordinarily being sufficient.

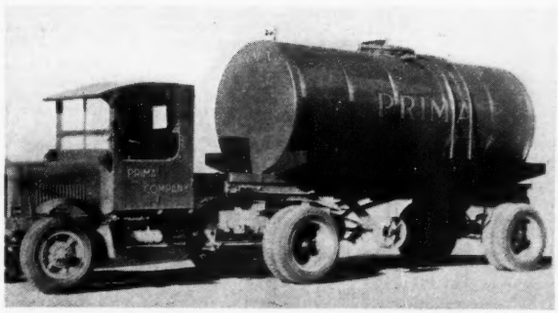


Feeder Handles Diatomaceous Earth

Diatomaceous earth, such as the kieselguhr used in refining beet sugar, is said to be uniformly fed to the process by the Geary feeder, developed by Galigher Co., 228 South West Temple St., Salt Lake City, Utah. The machine also will feed dry, granular, free-flowing materials. This feeder comprises a steel cone-shaped hopper inside of which is suspended a conical fabric bag. By means of a device connecting the lower end of the bag with the revolving feed plate, the walls of the bag are kept in constant motion, preventing any tendency of the material to "hang up" in the bag. This method of agitation also enables the feeder to operate with low power consumption. A revolving circular plate equipped with a flexible rubber impeller effects a positive discharge. Feeding is continuous and uniform, and the rate may be changed by a handwheel adjustment. When feeding kieselguhr, the feed range is from ¼ to 40 oz. per minute. The machine is driven by a ¼-hp. motor.



FOOD MANUFACTURERS



Beer Tank for Truck

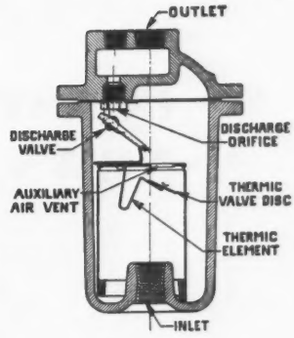
Beer may be transported from the brewery to branch bottling plants in bulk quantities with the tank manufactured by Groen Mfg. Co., Inc., Chicago, Ill., for Prima Co., Chicago. The tank has a capacity of 3,000 gal. and it is made of 10-gage Enduro stainless steel, a product of Republic Steel Corp., Youngstown, Ohio. The tank was built for a 25-lb. delivery pressure. All seams are welded, and inside surfaces are polished. An outer jacket of 14-gage aluminum covers the 2-in. cork insulation.

Stabilized Steel

Intergranular corrosion is effectively prevented in a new stabilized stainless steel developed by U. S. Steel Corp., 208 South La Salle St., Chicago, Ill., the manufacturer reports. The new product, which contains 18 per cent chromium and 8 per cent nickel, will be marketed as USS Stabilized 18-8. The removal of intergranular corrosion is said to be an important contribution to metallurgy, since this has been a serious factor where heat treatment is impracticable after welding and where the temperature is high.

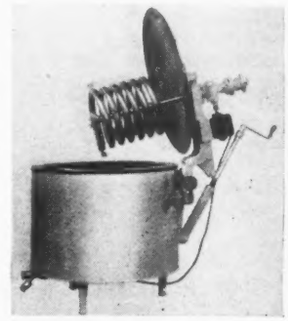
Quick Heating Trap

To promote quick heating in steam coils, Armstrong Machine Works, Three Rivers, Mich., has developed an inverted-bucket steam trap with an automatic air bypass. This trap has a large auxiliary air vent which quickly removes air from jacketed kettles, submerged cooking coils, drum dryers and similar equipment. A flat disk of stainless steel on the end of a strip of rustless thermostatic bi-metal closes the auxiliary air vent. As long as the trap remains cold, the disk is held away from the vent and air escapes so rapidly that the bucket cannot float and close the discharge valve. When steam reaches the trap, the thermic strip seats the disk, which prevents steam from escaping through the auxiliary vent.



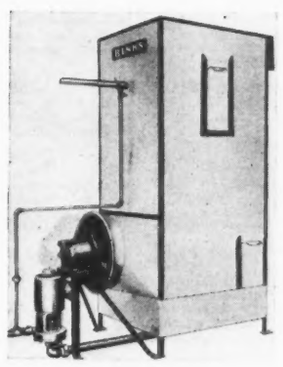
All-Purpose Vat

Designed for any operation involving the heating, cooling or mixing of any dairy product, the "All-Purpose" vat manufactured by Pfaudler Co., Rochester, N. Y., is held to provide small first cost and low upkeep. Outstanding mechanical features of this vat include a revolving heating or cooling coil with agitators attached, a glass-lined steel interior, a screw elevated cover which lifts the coil from the tank and facilitates cleaning, pure corkboard insulation, and a silent motor drive. The vat is available in 60-, 100-, 200- and 330-gal. capacities, and it may be had with a stationary coil and a separate agitator. The coils have approximately 25 sq.in. of surface for each gallon of tank capacity.



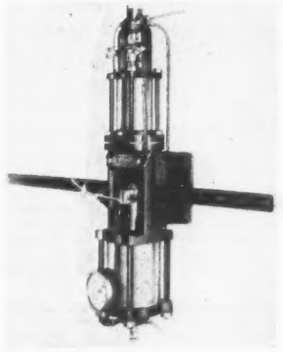
Forced-Draft, Indoor Cooling Tower

To meet conditions which make standard roof-mounted atmospheric cooling towers impracticable, Binks Manufacturing Co., 3114 Carroll Ave., Chicago, Ill., has developed a forced-draft, indoor cooling tower. This tower, type FD, is built in standard sizes ranging from 5 to 50 g.p.m. The fan, located near the base, forces the air through a sprayed curtain of atomized water, the spray system using the Rotojet non-clog nozzles. The water is cooled to within 4 to 6 deg. F. of wet bulb temperature, about 2 per cent of it being evaporated. The tower can be provided with a bypass which mixes cooled water with the warm water entering the cooler to lower total temperature spread. All FD towers are fabricated of a heavy-gage galvanized copper-bearing steel with tinned or soldered joints and rivets.



Combustion Regulator For Small Boiler

Automatic control of small and medium-size steam boilers by means of steam pressure is accomplished with the regulator of Morey & Jones, Ltd., 922 South Hemlock St., Los Angeles, Calif. The regulator employs a 4½-in. cylinder and has an operating arm with a travel of 12 in. The arm movement, it is asserted, covers all needs for controlling dampers, gas and oil-firing valves, air inlet louvers, forced draft fans, stoker steam valves and rheostats. In operation, a pilot valve adjusted to balance the required boiler pressure admits steam (or water) into the cylinder when the pressure rises above the set point. The piston then moves and reduces the opening of the damper or firing valves. A compensator prevents too great a movement. When steam pressure falls, a reverse action occurs. The regulator is suitable for boiler pressures of 3 to 450 lb. per square inch.



THE MANUFACTURERS OFFER

Coolers—Specifications for the line of coolers manufactured by Niagara Blower Co., 6 East 45th St., New York, N. Y., are presented on mimeographed, loose-leaf sheets about 100 of which are assembled in a paper folder.

Scales — Sixty-seven leaflets covering the weighing equipment manufactured by Toledo Scale Co., Toledo, Ohio, are combined in a general catalog by the company. The catalog will fit a standard filing cabinet, and the cover is provided with a filing tab.

Rubber Goods—In its 24-page "Buyer's Guide to Mechanical Rubber Goods," Diamond Rubber Co., Inc., Akron, Ohio, presents information of practical value. One section describes the construction, functions and applications of rubber belts, giving a table for figuring the type and size of belt needed. Much space is given also to industrial hose.

Employee Handbooks — An analysis of the subjects discussed in employee handbooks, their physical make-up and methods of distributing them is contained in a 20-page report, "Employee Handbooks," by Metropolitan Life Insurance Co., One Madison Avenue, New York, N. Y. The material is based on a review of several manuals.

Synchronous Motors — Some practical information on the applications, construction, operating characteristics and advantages of both high- and low-speed synchronous motors is contained in a 52-page booklet by General Electric Co., Schenectady, N. Y. The publication also deals with special synchronous motors and with control apparatus for synchronous equipment.

Water Purification — A six-page folder containing an article on application and advantages of activated carbon in industrial water purification has been published by International Filter Co., 59 East Van Buren St., Chicago, Ill.

Refrigeration — Kold-Kan refrigeration, in which the refrigerant is contained in cans so that it may be refrozen after melting, is described in an 8-page bulletin, No. 402-A, by Frick Co., Waynesboro, Pa.

Optical Apparatus — The 30-page, April issue of *The Educational Focus*, by Bausch & Lomb Optical Co., Rochester, N. Y., contains a number of interesting articles, among which is one on the identification of minerals and crystals in powdered form.

Activated Carbon—In a 44-page booklet, Industrial Chemical Sales Co., Inc., 230 Park Ave., New York, N. Y., devotes chapters to the purification of sugar and syrup, vegetable and animal oils and fats, water, and chemicals.

Temperature Control—A well-illustrated 32-page bulletin, No. 3000-c, gives a complete description of compensated temperature-control instruments manufactured by Mason Regulator Co., 1190 Adams St., Dorchester Center, Boston, Mass.

Dairy Equipment—Practically all kinds of equipment for the dairy and ice cream industry are covered in a 40-page catalog by Mojonnier Bros. Co., 4601 West Ohio St., Chicago.

Vacuum Pans — The use of glass-lined steel vacuum pans is discussed in Bulletin No. 726 by Pfaudler Co., Rochester, N. Y. Chapters on preserves, tomato paste and fruit juice are included. Various types of vacuum pans are described.

CONSTRUCTION NEWS

	Proposed Construction Pending	Contracts Awarded — May	Contracts Awarded — Cumulative 1933 — No. Awards	Contracts Awarded — Cumulative 1933 — Total
Bakery Products	$140,000	$116,000	14	$244,000
Beverage	4,250,000	1,350,000	19	2,337,000
Canning and Preserving	.....	371,000	12	514,000
Confectionery	.....	75,000	1	75,000
Grain Mill Products	128,000	.....	8	484,000
Ice, Manufactured	60,000	.....	5	256,000
Meats and Meat Products	25,000	.....	3	108,000
Milk Products	148,000	176,000	20	685,000
Sugar	30,000	.....	..	.....
Miscellaneous	70,000	.....	7	328,000
Total	$ 4,851,000	$2,088,000	89	$5,031,000

PROPOSED WORK BIDS ASKED

Bakery—H. C. Hammel, Inc., Archt., 376 New York Ave., Newark, N. J., is preparing preliminary plans for the construction of a 1 story bakery, garage and shipping room. Estimated cost $50,000. Owner's name and location withheld.

Bakery—Krug Baking Co., 138-54 94th Ave., Jamaica, N. Y., plans to alter its bakery at 94th Ave. and 138th Pl., Jamaica. Estimated cost $50,000. G. Tennema, Baldwin, N. Y., is architect.

Bakery — Ward Baking Co., 461 Eddy St., Providence, R. I., will soon receive bids for 2 story, 28x99 ft. bakery. Equity Construction Co., 205 East 44th St., New York, N. Y., is engineer. Estimated cost $40,000.

Bottling Plant—E. J. Burke, Ltd., 47-24 27th St., Long Island City, N. J., bottlers of Bass's Ale, Guinness's Stout and other beverages, has purchased a site bounded by Skillman Ave., 27th and 28th Sts. and Nelson Ave., Long Island City, and plans to build a bottling plant and storage building. Estimated cost to exceed $500,000.

Bottling Works and Warehouse—Great Lakes Brewing Co., Indiana Ave., Grand Rapids, Mich., plans the construction of a 2 story bottling works and warehouse at Indiana Ave. and Bridge St. Estimated cost $200,000.

Brewery—Algonquin Brewing Co., E. B. Merritt, 945 Main St., Bridgeport, Conn., is having plans prepared by Fletcher Thompson, Inc., Archt., 1336 Fairfield Ave., Bridgeport, for altering and equipping brewery on Hallam St. Estimated cost with equipment $200,000.

Brewery—Dailey's Liquid Malt Co., 1531 St. John St., Flint, Mich., is receiving bids for 4 story, 116x150 ft. addition to brewery. Estimated cost $250,000. George J. Fuchs, 2885 Fisjer Bldg., Detroit, Mich., is architect.

Brewery—O. Lee Gordon, W. H. Caughman and Richard L. Lane, Columbia, S. C., recently incorporated with $500,000 capital stock, plan to construct a brewery at Columbia. Equipment estimated to cost $75,000 will be purchased.

Brewery—Horluck Malt & Brew Co., George Horluck, Pres., Westlake Ave. and Mercer St., Seattle, Wash., plans to remodel Harmon Bldg. into brew house and bottling works, to have a capacity of 3,000 cases of bottled beer and 100 bbls. draught beer daily. Estimated cost $200,000.

Brewery — Liberty Brewing Co., 190 Beach 82nd St., Rockaway Beach, N. Y., plans to alter and build additions to brewery. Estimated cost to exceed $200,000.

Brewery—A. B. Loomis, Archt., 5208 Howard Ave., Cleveland, O., is interested in a syndicate being formed to construct a brewery. Estimated cost $250,000. Architect would like to receive catalogues, plans and suggestions for brewing equipment.

Brewery — Arthur Rosenstein, Archt., 120 Mills St., Boston, Mass., is preparing plans for remodeling 4 story, 80x140 ft. building on Hillman St., New Bedford, Mass., into brewery, also installing equipment. Estimated cost $200,000. Owner's name withheld, address architect.

Brewery—San Bernardino Brewing Co., San Bernardino, Calif., is having plans prepared by Gay Engineering Corp., Engr., 2650 Santa Fe Ave., Los Angeles, for 2 story, 100x250 ft. brewery. Estimated cost $200,000.

Brewery — Santa Fe Brewery Co., 518 Pershing Sq. Bldg., Los Angeles, Calif., is having preliimnary plans prepared by Merrill & Wilson, Archts., 549 Petroleum Securities Bldg., Los Angeles, for remodeling two existing buildings on Santa Fe Ave. between 15th and 16th Sts. into brewery, also building 3 story addition. Estimated cost $1,000,000.

Brewery—Valley Mead Brewing Co., P. J. Coril, pres., Youngstown and Cleveland, O., is having plans prepared by Braziell & Anderson, archts., 309 4th Ave., Pittsburgh, Pa., for remodeling and building addition to brewery at Meadville, Pa. Estimated cost $250,000.

Brewery—E. H. Weiner Co., c/o E. H. Weiner, pres., Hill and Forge Sts., Akron, O., is having plans prepared by E. A. Broberg, archt. & engr., 2014 West 53rd St., Cleveland, for remodeling building at Hill and Forge Sts., into brewery, also building additions. Estimated cost $300,000.

Milk Plant—Borden Sales Co., Inc., 311 California St., San Francisco, Calif., and 350 Madison Ave., New York, N. Y., contemplates the construction of a milk plant at Oak and Aurora Sts., Stockton, Calif. Estimated cost $100,000.

Creamery—John B. Howe, Jr. and Sr., Hamilton, Mont., plan the construction of a 1 story, 40x80 ft. creamery at Hamilton.

Milk Plant—J. Z. Cohen, Archt., 337 Rockaway Ave., Brooklyn, N. Y., is receiving bids for extension to milk plant at Powell St. and New Lots Ave., Brooklyn, for Celia Kotcher.

Packing Plant—United Dressed Beef Co., 403-9 East 44th St., New York, N. Y., plans to alter its packing plant. A. E. Bump, 761 1st Ave., New York, is architect. Estimated cost $25,000.

Grain Elevator—Atlanta Milling Co., 196 Butler St. S. E., Atlanta, Ga., contemplates rebuilding its grain elevator recently destroyed by fire. Estimated cost $100,000.

Grain Elevator—North Branch Elevator Co., North Branch, Mich., contemplates the construction of a grain elevator. Estimated cost $28,000.

Ice Plant—Arizona Ice & Cold Storage Co., Tucson, Ariz., will soon receive bids for the construction of an ice plant to have a daily capacity of 20 tons and a storage capacity of 2,000 tons, at Eloy, Ariz. J. Martin is manager. Estimated cost $60,000.

Sugar Refinery—Sacramento River Farms, Ltd., Hamilton City, Calif., plans to recondition its sugar plant here. Estimated cost $30,000.

Warehouse—Maxfield Feed & Coal Co., Inc., 175 West 3rd St., Salt Lake City, Utah, contemplates the construction of a warehouse. Estimated cost $25,000.

Vinegar Plant—H. J. Heinz Co., Pittsburgh, Pa., will soon receive bids for the construction of an addition to its vinegar plant at Leamington, Ont. C. A. Hahn, Pittsburgh, is preparing plans. Estimated cost $45,000.

CONTRACTS AWARDED

Bakery—Aurora American Baking Co., 228 Galena Blvd., Aurora, Ill., awarded contract for 1 story, 60x100 ft. addition to bakery to Smith & Son, Aurora, Ill.

Bakery—Colonial Baking Co., 1225 Bluff St., Des Moines, Ia., awarded contract for addition to bakery to R. Anderson & Son, 19 East 32nd Court, Des Moines.

Bakery—Helms Bakeries, Ltd., 8800 Venice Blvd., Los Angeles, Calif., is building an addition to its bakery. Grant & Bruner, 607 Ferguson Bldg., Los Angeles, are architects. Work is being done by owner. Estimated cost $32,000.

Bakery—J. B. LaBrondo & Son, 70 Pacific St., Newark, N. J., awarded contract for bakery and garage here to A. Cucuzzella, 27 Nichols St., Newark. Estimated cost including equipment $28,000.

Brewery—Consumers Brewing Co., 25 Fountain St., Providence, R. I., will alter factory at Hillsgrove, L. I., into brewery. Estimated cost $300,000. Work will be done by day labor.

Brewery—Elgin Brewing Co., 326 Crystal St., Elgin, Ill., awarded contract for remodeling brewery to T. A. Kvale, Joliet, Ill. Estimated cost $100,000.

Brewery—Olympic Brewing Co., Olympia, Wash., awarded contract for brewery, including bottling plant, at Tumwater, Wash., to A. D. Belanger & Co., 222 Westlake St. N., Seattle, Wash. Estimated cost $300,000.

Brewery—Schmidt Brewing Co., Frederick W. Schmidt, pres., Fletcher Dr., Los Angeles, Calif., is having plans prepared by Gay Engineering Corp., 2650 Santa Fe Ave., Los Angeles, for brewery to be erected on 2½ acre site to have a capacity of 100,000 bbl. per year. Project will include brew house, cellar building and bottling plant. Gay Engineering Co. will have charge of construction.

Brewery—Tivolo Brewing Co., 10129 Mack Ave., Detroit, Mich., awarded contract for 2 story brick and steel addition to brewery on Mack Ave., to Martin Krausmann Co., 955 East Jefferson Ave., Detroit. Estimated cost $150,000.

Ice Cream Plant—Castle Ice Cream Co., C. E. Newman, pres., 2531 West Pennway St., Kansas City, Mo., awarded contract for 1 story addition to plant to L. M. Denny Construction Co., 1000 Davidson Bldg., Kansas City, Mo.

Milk Plant—W. M. Evans Dairy, 3480 Fulton St., Brooklyn, N. Y., awarded contract for extension to milk plant at Fulton St. and Elderts Lane, to Caye Construction Co., 356 Fulton St. Estimated cost $30,000.

Ice Cream Plant—Furnas Ice Cream Co., 34 North Bway., Akron, O., awarded contract for 1 story ice cream plant on Grant St., to C. W. & P. Construction Co., Second Natl. Bank Bldg., Akron. Estimated cost $40,000.

Dairy—Puritan Dairy, 315 High St., Perth Amboy, N. J., awarded contract for dairy at Fayette and Wilson Sts., Perth Amboy, to Paul M. Sterling, Inc., 230 Park Ave., New York, N. Y. Estimated cost $50,000.

Cheese Factory—Swift & Co., Taylor and San Antonio Sts., Chicago, Ill., will build a 1 story, 25x38 ft. cheese factory at Taylor, Tex. Work will be done by owner.

Candy Factory—K-B Chocolate Co., H. H. Koffman, 800 East Midland St., Bay City, Mich., awarded contract for candy factory on East Midland St., to W. J. DeFrain, Bay City. Estimated cost $75,000.

Cannery—U. S. Products Co., Race St. and Moorpark Ave., San Jose, Calif., awarded contract for 1 story, 105x180 ft. cannery here to R. O. Summers, 17 North 1st St., San Jose.

Packing Plant—Chula Vista Mutual Lemon Grower's Assn., Chula Vista, Calif., awarded contract for packing plant to Dennstedt Co., 3761 Fifth Ave., San Diego, Calif. Estimated cost $30,000.

Packing Plant—John J. Felin, Inc., 4142 Germantown Ave., Philadelphia, Pa., awarded contract for packing plant to Frank G. English & Son, 1608 North Carlisle St., Philadelphia. Estimated cost $185,000.

Packing Plant—Interests represented by C. McKenzie, archt., Twohy Bldg., San Jose, Calif., awarded contract for 1 story packing plant at 5th and Market Sts., San Jose, Calif., to J. S. Newell, 828 Minnesota St., San Jose. Estimated cost $42,201.

Citrus Packing Plant—Rio Grande Valley Citrus Exchange, McAllen, Tex., will build a 1 story, 40x70 ft. citrus packing plant at Edinburg, Tex., by day labor.

Cold Storage Plant—National Fruit & Produce Co., Commerce St., New Haven, Conn., awarded contract for 1 story cold storage plant to Jacob Alpert, 136 Sherman Ave., New Haven.

Cold Storage Plant—F. J. Watson, c/o Shepard & Calvin, archts., 36 Toronto St., Toronto, Ont., awarded contract for cold storage and produce packing plant at Dixie, Ont., to Ferguson Contracting Co., 17 Queen St. E., Toronto. Estimated cost $30,000.